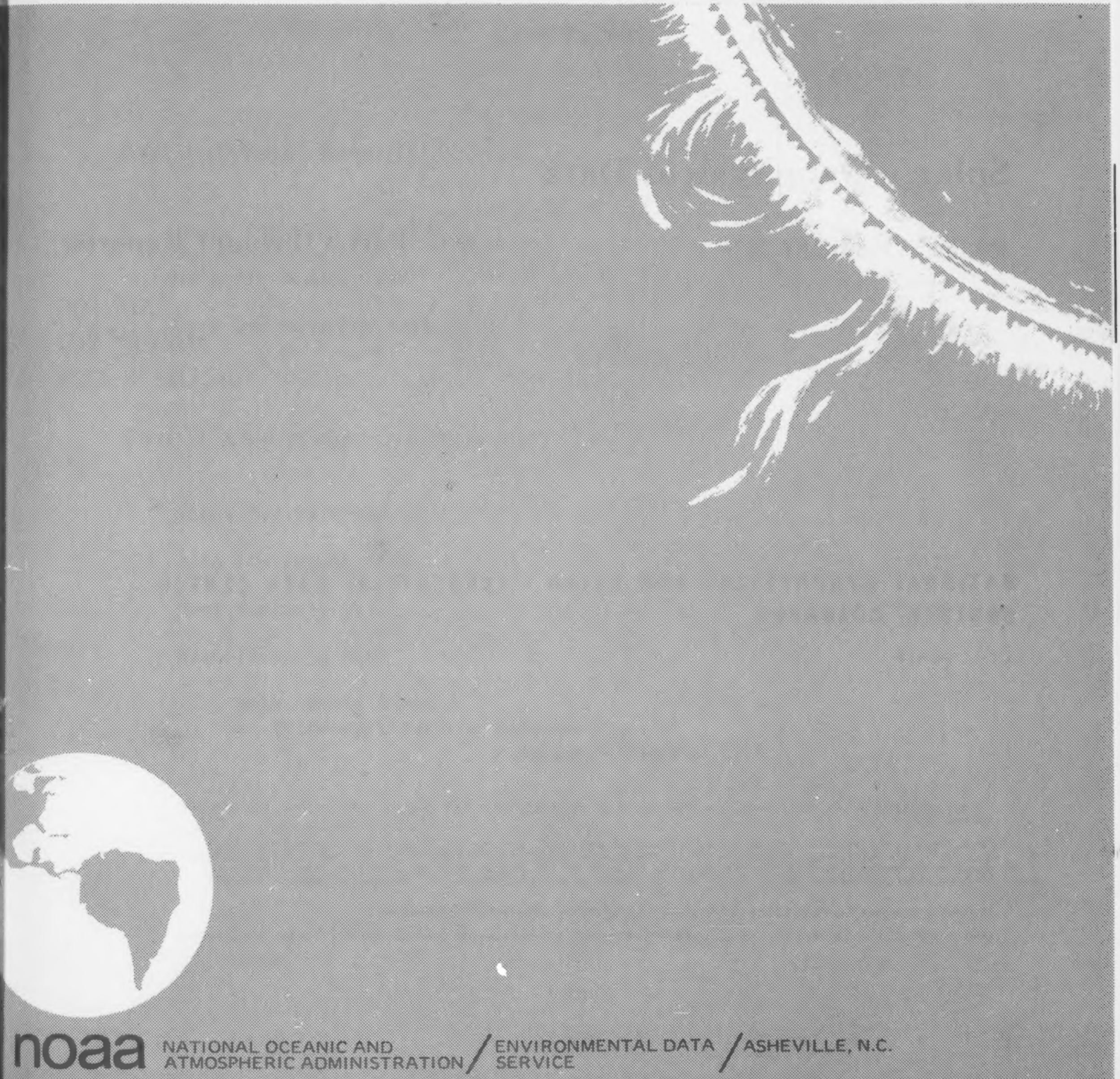
February 1977 Number 390-Part I P-A STACKS MAR 21 19

Solar-Geophysical Data prompt reports

Data for January 1977–December 1976

Explanation of Data Reports Issued as Number 378 (Supplement) February 1976



noaa NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION / ENVIRONMENTAL DATA SERVICE / ASHEVILLE, N.C.

U.S. DEPARTMENT OF COMMERCE
Juanita M. Kreps, Secretary
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
Robert M. White. Administrator
ENVIRONMENTAL DATA SERVICE
Thomas S. Austin, Director

Solar - Geophysical Data

NO. 390 FEBRUARY 1977

Part I (Prompt Reports)

DATA FOR
JANUARY 1977
DECEMBER 1976

NATIONAL GEOPHYSICAL AND SOLAR - TERRESTRIAL DATA CENTER
BOULDER, COLORADO

For obtaining bulletins on a data exchange basis, send request to: World Data Center A for Solar-Terrestrial Physics, NOAA, Boulder, Colorado 80302.

For sale through the National Geophysical and Solar-Terrestrial Data Center, NOAA, Boulder, CO 80302. Subscription Price: $34.00 annually for both Part I (Prompt Reports) and Part II (Comprehensive Reports) or $18.00 annually for either part. Annual supplement containing explanation is included. For foreign mailing add $32.00 for both parts or $16.00 for either part. Single issue price $1.50 for either part and $1.40 for the extra issue. Make checks and money orders payable to: Department of Commerce, NOAA/NGSDC.

To standardize referencing these reports in the open literature, the following format is recommended:

Solar-Geophysical Data, 390 Part I (or Part II), pages, February 1977, U.S. Department of Commerce, (Boulder, Colorado, U.S.A. 80302).

SOLAR - GEOPHYSICAL DATA

No. 390

Issued in two parts

Hope I. Leighton, Editor

J. Virginia Lincoln, Director
Solar - Terrestrial Data Services Division

CONTENTS

Part I (Prompt Reports)

	Page
Index for 1976 and 1977	2
Data for January 1977	3-24
Data for December 1976	25-118

Part II (Comprehensive Reports)

Index for 1976 and 1977	2
Data for August 1976	3-27
Data for July 1976	29-39
Miscellaneous Data	41-44

Solar Radio Waves -
Selected Events by Radioheliograph
August - October 1976

INDEX FOR 1976 - 1977 DATA PUBLISHED IN "SOLAR-GEOPHYSICAL DATA"

		1976 Aug	Sep	Oct	Nov	Dec	1977 Jan
A.	Solar and Interplanetary Phenomena						
A.1	Sunspot Drawings	386A 22	387A 26	388A 26	389A 26	390A 28	
A.2a	Zürich Provisional Relative Sunspot Numbers R_Z	385A 7	386A 7	387A 7	388A 7	389A 7	390A 7
A.2b	Zürich Final Sunspot Numbers R_Z						
A.2c	American Relative Sunspot Numbers R_A'	385A 7	386A 7	387A 7	388A 7	389A 7	390A 7
A.3a	Mt. Wilson Magnetograms	386A 22	387A 26	388A 26	389A 26	390A 28	
A.3b	Mt. Wilson Magnetic Characteristics of Sunspots	386A 84	387A 86	388A 88	389A 86	390A 90	
A.3c	Kitt Peak Magnetograms	386A 22	387A 26	388A 26	389A 26	390A 28	
A.3d	Mean Solar Magnetic Field (Stanford)						390A 21
A.4	Hα Spectroheliograms	386A 22	387A 26	388A 26	389A 26	390A 28	
A.5	Calcium Plage Drawings - McMath (or Catania)	386A 22	387A 26	388A 26	389A 26	390A 28	
A.5a	Calcium Plage (McMath) and Sunspot Regions	386A 84	387A 86	388A 88	389A 86	390A 90	
A.5b	McMath Daily Calcium Plage Indices	386A 89	387A 93	388A 94	389A 90	390A 95	
A.6	Hα Synoptic Charts	386A 20	387A 26	388A 26	389A 26	390A 26	
A.6b	Synoptic Chart and Active Regions (Paris)	390B 4					
A.7f	Helium D3 Chromosphere (Big Bear)	385A 21	---	387A 20	388A 21	389A 21	390A 18
A.7g	Helium Synoptic Maps (KPNO)						390A 19
A.7h	Coronal Line Emission (Sac Peak)	386A 22	387A 26	388A 26	389A 26	390A 28	
A.8aa	2800 MHz - Daily Values of Solar Flux (ARO-Ottawa)	385A 7	386A 7	387A 7	388A 7	389A 7	390A 7
A.8ac	2800 MHz - Daily Values of Adj. Solar Flux (ARO-Ottawa)	385A 7	386A 7	387A 7	388A 7	389A 7	390A 7
A.8g	Daily Values of Adjusted Solar Flux (AFGL)	385A 7	386A 7	387A 7	388A 7	389A 7	390A 7
A.9cb	8.6 mm Radio Maps of the Sun (NELC - La Posta)	386A 22	387A 26	388A 26	389A 26	390A 28	
A.9d	2 cm Radio Maps of the Sun (NELC - La Posta)	386A 22	387A 26	388A 26	389A 26	390A 28	
A.10a	169 MHz - Interferometric Observations (Nancay)	---	386A 12	387A 12	388A 12	389A 12	390A 12
A.10c	21 cm East-West Solar Scans (Fleurs)	385A 14	387A101	388A101	388A 14	389A 14	
A.10d	43 cm East-West Solar Scans (Fleurs)	385A 15	387A102	388A102	388A 15	389A 15	
A.10e	10.7 cm East-West Solar Scans (Ottawa-ARO)	385A 13	386A 13	387A 13	388A 13	389A 13	390A 13
A.11g	Solar X-ray (SMS/GOES)	385A 18	386A 16	387A 18	388A 19	389A 18	390A 15
A.11h	Solar X-ray (OSO-8; 1975-057A)	386A 22	387A 26	388A 26	389A 26	390A 28	
A.11i	Solar X-ray (Columbia U.)						
A.12ba	Cosmic Ray Protons (Pioneers 6 & 7)	---	386A 15	387A 16	388A 18	---	---
A.12bb	Cosmic Ray Protons (Pioneers 8 & 9)	---	---	387A 17	---	---	---
A.12e	Energetic Solar Particles (IMP H & J)	390B 23					
A.13a	Solar Wind (Pioneers 6 & 7)	---	386A 15	387A 16	388A 18	---	---
A.13ab	Solar Wind (Pioneers 8 & 9)	---	---	387A 17	---	---	---
A.13d	Solar Wind from IPS Measurements			387A 15	388A 17	389A 17	390A 24
A.13e	Solar Plasma (IMP H & J)	390B 22					
A.17	Interplanetary Magnetic Field (Pioneer 8)	---	---	---	---	---	---
A.17	Interplanetary Magnetic Field (Pioneer 9)	---	---	387A 17	---	---	---
A.17c	Inferred IP Magnetic Field	385A 22	386A 18	387A 21	388A 22	389A 22	390A 20
A.18	Interplanetary Electric Field (Pioneer 8)	---	---	---	---	---	---
A.18	Interplanetary Electric Field (Pioneer 9)	---	---	387A 17	---	---	---
B.	Ionospheric (and Radio Wave Propagation) Phenomena						
B.52	Graphs of Transmission Frequency Range	386A112	387A116	388A116	389A110	390A116	
B.53	Quality Figures Based on Frequency Ranges	386A114	387A118	388A118	389A109	390A118	
C.	Flare-Associated Events						
C.1a	Optical Observations Flares	385A 10	386A 10	387A 10	388A 10	389A 10	390A 10
C.1ba	Optical Observations Flares (Standardized Data)	390B 6					
C.1d	Flare Patrol Observations	385A 11	386A 11	387A 11	388A 11	389A 11	390A 11
C.1d	Flare Patrol Observations	390B 11					
C.1e	Flare Indices (by day)	390B 10					
C.1f	Flare Indices (by Region)						
C.3	Solar Radio Waves - Outstanding Occurrences	390B 12					
	Solar Radio Waves - Fixed Frequencies - Selected	385A 16	386A 14	387A 14	388A 16	389A 16	390A 14
C.3t	43.25, 80 and 160 MHz Selected Bursts (Culgoora)	390B 42	390B 43	390B 44			
C.4a	Solar Radio Spectral Obs. (Fort Davis)	386A 91	387A 95	388A 96	389A 92	390A 97	
C.4b	Solar Radio Spectral Obs. (Boulder)	---	---	---	---	---	
C.4d	Solar Radio Spectral Obs. (Culgoora)	387B 32	389B 29	389B 32	389A 92		
C.4e	Solar Radio Spectral Obs. (Weissenau)	386A 91	387A 95	388A 96	389A 92	390A 97	
C.4f	Solar Radio Spectral Obs. (Sagamore Hill)	386A 91	387A 95	388A 96	389A 92	390A 97	
C.4h	Solar Radio Spectral Obs. (Dwingeloo)	386A 91	387A 95	388A 96	389A 92	390A 97	
C.4i	Solar Radio Spectral Obs. (Dürnten)	386A 91	387A 95	388A 96	389A 92	390A 97	
C.4j	Solar Radio Spectral Obs. (Manila)	386A 91	387A 95	388A 96	389A 92	390A 97	
C.5e	Solar X-ray (SMS/GOES)	385A 20	---	---	---	389A 20	390A 17
C.5f	Solar X-ray (Columbia U.)						
C.6	Sudden Ionospheric Disturbances	386A 90	387A 94	388A 95	389A 91	390A 96	
D.	Geomagnetic and Magnetospheric Phenomena						
D.1a	Geomagnetic Indices Kp, Kn, Ks, Km, Ap, aa, Cp	386A104	387A108	388A108	389A102	390A107	
D.1ba	27-day Chart of Kp Indices	386A106	387A110	388A110	389A104	390A109	
D.1c	27-day Chart of C9					390A110	
D.1d	Principal Magnetic Storms	386A109	387A113	388A113	389A107	390A114	
D.1e	Reduced Magnetograms	---			---	---	
D.1f	Sudden Commencement and Solar Flare Effects	386A110	387A114	388A114	389A108	390A115	
D.1g	Equatorial Indices Dst	386A108	387A112	388A112	389A106	390A113	
F.	Cosmic Rays						
F.1a	Cosmic Ray Neutron Counts (Deep River)	386A 99	387A103	388A103	389A 97	390A106	
F.1b	Cosmic Ray Neutron Counts (Climax)	386A 99	387A103	388A103	389A 97	390A106	
F.1e	Cosmic Ray Neutron Counts (Alert)	386A 99	387A103	388A103	389A 97	390A106	
F.1f	Cosmic Ray Neutron Counts (Calgary)	386A 99	387A103	388A103	389A 97	390A106	
F.1g	Cosmic Ray Neutron Counts (Sulphur Mountain)	386A 99	387A103	388A103	389A 97	390A106	
F.1h	Cosmic Ray Neutron Counts (Thule)	---	---	---	---		
F.1i	Cosmic Ray Neutron Counts (Kiel)	386A 99	387A103	388A103	389A 97	390A106	
F.1j	Cosmic Ray Neutron Counts (Tokyo)	386A 99	387A103	388A103	389A 97	390A106	
H.	Miscellaneous						
H.60	IUWDS Alert Decisions	385A 5	386A 5	387A 4	388A 5	389A 4	390A 4
H.62	Abbreviated Calendar Record						

Note: A = Part I, B = Part II.

386A 22 listed under 1976 Aug shows that data for August 1976 were contained in *Solar-Geophysical Data* Number 386 - Part I beginning on page 22.

JANUARY 1977 DATA

Contents

Page

Alert Period
IUWDS Alert Periods (Advance and Worldwide) 4-5

Daily Solar Indices
12-Month Tables Sunspot Numbers, R_Z, and 2800 MHz Flux Adjusted to 1 A.U. 6
Combined Table Sunspot Numbers and Solar Fluxes 7
Graph of Sunspot Cycles 8
Zürich Smoothed Observed and Predicted Sunspot Numbers 9

Solar Flares
Hα Solar Flares 10
No-Flare-Patrol Chart 11

Solar Radio Waves
169 MHz Solar Interferometric Chart - Nancay 12
10.7 cm East-West Solar Scans - ARO, Ottawa 13
21 cm East-West Solar Scans - Fleurs (not available at time of publication)
43 cm East-West Solar Scans - Fleurs (not available at time of publication)
Selected Fixed-Frequency Occurrences 14

Solar X-ray Radiation
SMS-2 GOES 15-17

Coronal Holes
Helium D3 Chromosphere 18
Helium 10830 Å Synoptic Map 19

Spacecraft Observations
No observations

Inferred IP Magnetic Field Polarities 20

Mean Solar Magnetic Field
Stanford Mean Solar Magnetic Field Map 21
Stanford Mean Solar Magnetic Field Tables 22-23

Solar Wind Measurements
Scintillation Observations 24

ALERT PERIODS

INTERNATIONAL URSIGRAM AND WORLD DAYS SERVICE

JANUARY 1977

SUMMARY OF THE GEOALERT WWA MESSAGES

Message serial number	Date of issue	Date of obser-vation	Wolf number	10 cm solar flux	A index	Active Regions: Location Lat-Long	Active Regions: No. of Flares Total	M	X	Outstanding events	Forecasts: Date	Forecasts: Location Lat-Long	Desc*	Alert Situations
01	01	31	16	79	09	S19W20	2	0	0		01	S19W20	E	SOLQUIET MAGNIL
02	02	01	32	76	08	S18W35 N03E75 N32W37	1 0 0	0 0 0	0 0 0		02	S18W35 N03E75 N32W37	Q Q Q	SOLQUIET MAGQUIET
03	03	02	44	79	04	S19W49 N04E61 N33W51	0 0 0	0 0 0	0 0 0		03	S19W49 N04E61 N33W51	Q Q Q	SOLQUIET MAGALERT 04/08
04	04	03	37	79	03	S19W62 N06E47 N33W64	0 0 0	0 0 0	0 0 0		04	S19W62 N06E47 N33W64	Q Q Q	SOLQUIET MAGALERT MINOR RECURRENCE 04/09
05	05	04	39	78	07	S19W75 N06E33 N32W76	1 0 0	0 0 0	0 0 0		05	S19W75 N06E33 N32W76	E Q Q	SOLQUIET MAGALERT MINOR RECURRENCE 05/09 STRATWARM ALERT /WEDNESDAY/ STRATWARM EXISTS. GREATEST WARMING NEAR 40 KM OVER ARCTIC FROM GREEN-LAND TO KARA SEA. STRATALERT WESTHEM /JANUARY 5, 1977/ STRONG UPPER STRATOSPHERE WARMING HAS OCCURRED BETWEEN 25 AND 50 KM FROM EUROPE TO SIBERIA WITH GREATEST WARMING NEAR 40 KM OVER ARCTIC FROM GREENLAND TO KARA SEA. TEMPERATURE INCREASE EXCEEDING 80°C NOTED AT THULE ROCKET SITE DEC. 28 TO JAN. 3.
06	06	05	46	77	12	S20W87 N05E21 N31W90 N22E58	0 0 1 0	0 0 0 0	0 0 0 0		06	S20W87 N05E21 N31W90 N22E58	Q Q Q Q	SOLQUIET MAGALERT MINOR RECURRENCE 06/09 STRATWARM ALERT /THURSDAY/ STRATWARM EXISTS ARCTIC REGION SIBERIA TO CANADA
07	07	06	22	74	10	N05E09 N21E44	0 0	0 0	0 0		07	N05E09 N21E44	Q Q	SOLQUIET MAGALERT MINOR RECURRENCE 07/09 STRATWARM ALERT /FRIDAY/ STRATWARM EXISTS ARCTIC REGION TO CANADA
08	08	07	11	74	06	N05W04	0	0	0		08	N05W04	Q	SOLQUIET MAGALERT MINOR RECURRENCE 07/09 STRATWARM ALERT /SATURDAY/ STRATWARM EXISTS ARCTIC REGION. ANTICYCLONE NEAR POLE IN UPPER STRATOSPHERE.
09	09	08	00	72	05	-	-	-	-		09	SPOTNIL		SOLQUIET MAGQUIET (SHOULD HAVE BEEN MAGNIL)
10	10	09	00	71	05	-	-	-	-		10	SPOTNIL		SOLQUIET MAGQUIET
11	11	10	00	71	03	-	-	-	-		11	SPOTNIL		SOLQUIET MAGQUIET
12	12	11	16	74	10	S27E03	1	0	0	THE GEOMAGNETIC FIELD EXPERIENCED MINOR STORM CONDI-TIONS BETWEEN 1400Z AND 1800Z BUT HAS SINCE RETURNED TO UNSETTLED CONDITION. MORE BRIEF PERIODS OF MINOR STORM CON-DITIONS ARE EXPECTED DURING NEXT 24 HOURS	12	S27E03	E	SOLQUIET MAGALERT MINOR RECURRENCE 12 STRATWARM ALERT /TUESDAY/ STRAT-WARM WHICH OCCURRED LATE DECEMBER TO EARLY JANUARY HAS BEEN FOLLOWED BY WEAK POLAR CIRCULATION REVERSAL IN GREATER PART OF STRATOSPHERE BY JAN-UARY 10. COOLING IN UPPER STRATO-SPHERE NOTED SINCE ABOUT JANUARY 4.
13	13	12	31	78	10	S29W09	4	0	0		13	S29W09	E	SOLQUIET MAGNIL
14	14	13	35	80	05	S28W23	3	0	0		14	S28W23	E	SOLQUIET MAGQUIET
15	15	14	20	77	16	S29W37	0	0	0		15	S29W37	E	SOLQUIET MAGQUIET
16	16	15	32	77	09	S29W50	0	0	0		16	S29W50	E	SOLQUIET MAGQUIET
17	17	16	39	80	06	S29W61 N19W03	0 0	0 0	0 0		17	S29W61 N19W03	Q Q	SOLQUIET MAGQUIET
18	18	17	34	79	05	S29W75 N22W07	0 0	0 0	0 0		18	S29W75 N22W07	Q Q	SOLQUIET MAGQUIET STRATWARM ALERT /TUESDAY/ STRONG ANTICYCLONIC CIR-CULATION PERSISTS 60N TO POLE THROUGHOUT TROPOSPHERE TO MID STRATOSPHERE. POLAR STRATOSPHERIC TEMPERATURES COOLING.
19	19	18	41	78	08	S29W89 N22W20 N16W68	0 0 0	0 0 0	0 0 0		19	S29W89 N22W20 N16W68	Q Q Q	SOLQUIET MAGQUIET STRATWARM ALERT /WEDNESDAY/ ANTICYCLONE CONTINUES OVER POLAR REGIONS.
20	20	19	00	79	04	-	-	-	-		20	SPOTNIL		SOLQUIET MAGQUIET STRATWARM ALERT /THURSDAY/ POLAR ANTICYCLONE WEAKEN-ING.
21	21	20	12	78	09	N26E10	0	0	0		21	N26E10	Q	SOLQUIET MAGQUIET

ALERT PERIODS

INTERNATIONAL URSIGRAM AND WORLD DAYS SERVICE

JANUARY 1977

SUMMARY OF THE GEOALERT WWA MESSAGES

Message serial number	Date of issue	Date of observation	Wolf number	10 cm solar flux	A index	Active Regions: Location Lat-Long	No. of Flares: Total	M	X	Outstanding events	Forecasts: Date	Location Lat-Long	Desc*	Alert Situations
22	22	21	22	76	05	N31E64 N26E81	0 0	0 0	0 0		22	N31E64 N26E81	Q Q	SOLQUIET MAGQUIET STRATWARM ALERT /SATURDAY/ POLAR ANTICYCLONIC CIRCULATION WEAKENING. GRADUAL COOLING CONTINUES.
23	23	22	40	79	08	N26W19 N32E32 N28E64	0 0 0	0 0 0	0 0 0		23	N26W19 N32E32 N28E64	Q Q Q	SOLQUIET MAGQUIET
24	24	23	67	81	06	N24W31 N32E34 N28E48 S25E12	0 0 0 0	0 0 0 0	0 0 0 0		24	N24W31 N32E34 N28E48 S25E12	Q Q Q Q	SOLQUIET MAGQUIET
25	25	24	48	81	07	N25W44 N30E23 N26E36 S28E00	0 0 0 0	0 0 0 0	0 0 0 0		25	N25W44 N30E23 N26E36 S28E00	Q Q Q Q	SOLQUIET MAGQUIET STRATWARM ALERT /TUESDAY/ STRATWARM ENDS. VORTEX RETURNING POLEWARD ABOVE 25 KM. AS POLAR REGION COOLS. WEAK LOWER STRATOSPHERE POLAR ANTICYCLONE REFLECTS TROPOSPHERIC PATTERN.
26	26	25	24	77	07	N26W58 N30E10	0 0	0 0	0 0		26	N26W58 N30E10	Q Q	SOLQUIET MAGQUIET
27	27	26	55	78	03	N24W71 N27E07 S19W38	0 0 0	0 0 0	0 0 0		27	N24W71 N27E07 S19W38	Q Q Q	SOLQUIET MAGQUIET
28	28	27	17	78	03	S20W48	0	0	0		28	S20W48	Q	SOLQUIET MAGQUIET
29	29	28	24	80	06	S20W63	0	0	0	SMALL SC OCCURRED 28/2010Z 15γ	29	S20W63	Q	SOLQUIET MAGALERT MINOR RECURRENCE 29/30
30	30	29	16	79	12	S20W75	0	0	0		30	S20W75	Q	SOLQUIET MAGALERT MINOR RECURRENCE 30
31	31	30	12	79	22	S06E27	0	0	0		31	S06E27	Q	SOLQUIET MAGALERT MINOR RECURRENCE 31
32	01	31	14	82	15	N27E52	2	1	0		01	N27E52	E	SOLQUIET MAGNIL

* Q=Quiet E=Eruptive A=Active P=Proton C=Caution D=Doubtful O.G.=Other Groups MF=Major Flare

RELATIVE SUNSPOT NUMBERS

ZURICH, R_z

1976 PROVISIONAL 1977 PROVISIONAL

DAY	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
1	0	0	26	35	0	9	10	17	31	7	0	23
2	0	0	25	26	0	8	18	20	28	0	0	32
3	0	0	22	25	0	14	19	12	30	0	0	25
4	0	0	13	8	0	8	14	11	32	0	0	22
5	0	0	12	22	0	8	17	17	25	0	0	21
6	0	10	9	10	0	10	15	10	24	0	0	13
7	0	12	6	10	0	7	26	9	30	0	0	0
8	0	7	0	9	11	0	30	9	7	0	20	0
9	0	10	8	8	10	0	31	18	14	0	25	0
10	0	12	10	10	7	0	24	22	0	0	16	0
11	0	13	15	16	7	0	22	24	0	0	24	14
12	0	13	17	17	8	0	29	20	14	0	16	19
13	13	13	17	23	8	0	27	12	17	0	12	23
14	16	22	19	30	15	0	16	10	25	0	34	22
15	18	16	19	17	18	0	8	16	27	7	34	20
16	11	11	19	12	12	0	15	14	32	7	39	18
17	8	30	24	18	18	0	19	8	36	14	34	30
18	15	45	27	8	24	0	23	8	28	20	18	26
19	10	51	27	20	23	0	25	7	21	13	16	7
20	12	51	30	20	17	0	19	0	20	12	8	0
21	8	48	39	14	30	0	17	0	15	8	9	15
22	7	36	20	7	31	0	8	0	18	13	9	24
23	0	28	17	15	23	0	9	7	34	11	9	34
24	7	25	16	8	26	0	17	7	33	10	17	35
25	0	22	17	0	19	0	9	16	32	9	20	17
26	0	42	28	7	19	0	14	17	30	9	25	8
27	7	46	23	0	9	0	7	18	26	8	16	
28	0	50	21	0	16	0	8	18	21	8	16	13
29	0	42	26	0	11	0	9	25	17	8	19	11
30		32	38	0	10	0	10	31	9		19	8
31		27		0		0	9		0		11	10
MEAN	4.6	23.0	19.5	12.7	12.4	2.1	16.9	13.4	21.8	5.5	15.0	15.7

1976 yearly mean = 15.5

DAILY SOLAR FLUX AT 2800 MHz
OTTAWA ARO

FLUX ADJUSTED TO 1 A.U., S_a

1976 1977

DAY	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
1	68.6	37.8	79.6	77.6	68.4	69.3	75.9	76.3	74.6	70.9	70.2	73.8
2	68.6	68.1	76.8	74.2	67.9	69.1	77.8	75.3	73.9	69.1	71.6	76.5
3	68.4	67.4	76.2	71.9	68.1	69.5	82.3	75.7	73.8	69.8	71.2	76.0
4	68.4	67.4	74.8	71.5	68.4	68.6	82.3	75.9	73.1	69.9	71.3	75.5
5	67.6	67.6	73.1	71.1	68.7	69.5	84.2	75.4	74.0	70.9	70.1	74.0
6	68.1	67.6	71.3	69.9	69.3	69.6	84.3	73.1	74.7	69.7	70.1	72.4
7	69.3	68.8	70.3	70.3	69.0	69.5	83.7	73.0	74.5	69.5	69.7	71.4
8	68.4	67.9	71.9	70.2	70.7	69.7	82.0	72.9	74.6	69.3	70.8	69.6
9	68.3	68.2	74.1	70.6	70.1	69.7	82.8	73.2	74.8	70.7	74.3	68.4
10	68.5	68.5	75.3	71.7	71.0	70.1	82.8	75.8	74.9	69.4	76.8	68.8
11	68.4	68.9	77.2	72.5	71.4	70.2	80.4	75.7	73.7	70.5	78.3	71.2
12	67.8	69.8	78.2	72.6	71.7	69.8	80.6	75.7	73.3	70.8	78.6	74.9
13	69.7	70.9	79.7	73.6	72.0	69.8	78.7	74.3	72.6	69.4	78.1	77.5
14	69.9	70.1	79.6	74.2	73.7	70.7	73.4	74.7	74.4	69.2	81.0	74.5
15	69.6	69.1	79.3	76.9	74.3	71.4	72.8	73.9	75.5	71.1	79.8	75.6
16	69.7	72.6	80.7	79.2	77.1	69.8	72.9	75.8	77.0	71.1	77.8	77.5
17	69.9	74.4*	80.5	76.5	77.1	69.4	77.8	76.5	78.0	72.8	75.5	76.1
18	70.1	79.1	80.5	75.6*	77.9	70.6	78.2	74.3	77.3	75.6	73.9	75.4
19	70.1	81.6*	79.8	73.8	76.9	70.2	76.1	73.3	76.6*	74.6*	72.9	76.9
20	70.0	85.8	80.1	73.0	76.9	69.4	74.5	72.2	75.8	72.9	71.7	75.2
21	68.8	91.3	78.1	74.0	77.7	70.1	73.2	70.9	73.5	73.2	71.8	74.0
22	68.9	83.0	76.2*	72.5	78.9	70.1	72.3	70.5	75.4	73.3	73.4	76.9
23	69.2	87.0	75.7	71.9	76.5	68.7	70.8	72.0	80.1	72.5	73.7	78.7
24	69.6	82.2*	76.8	70.8	75.2	69.4	70.9	72.5	80.1	72.9	74.2	77.4
25	68.4	85.2	75.8	69.8	74.9	68.8	70.6	73.4	84.7	72.7	75.6	74.9
26	68.5	84.2*	75.8	69.5	74.3	68.5	70.1	72.8	80.4	72.1	75.6	76.0
27	68.5	85.6	74.6	69.6	72.8	69.4	71.5	73.3	77.4	73.7	75.2	75.3
28	67.9	87.1*	73.4	69.0	71.8	69.4	72.8	73.6	73.8	71.7	74.5	77.1
29	67.4	84.0	79.7	68.0	71.3	69.4	73.3	71.9	72.1	69.7	74.8	76.1
30		82.4	79.6*	68.1	70.3	70.7	73.0	72.6	72.1		75.1	76.3
31		82.7		68.7		72.3	73.8		70.4		76.4	79.6
MEAN	68.8	75.9	76.8	72.2	72.8	69.8	76.6	73.9	75.4	71.3	74.3	74.9

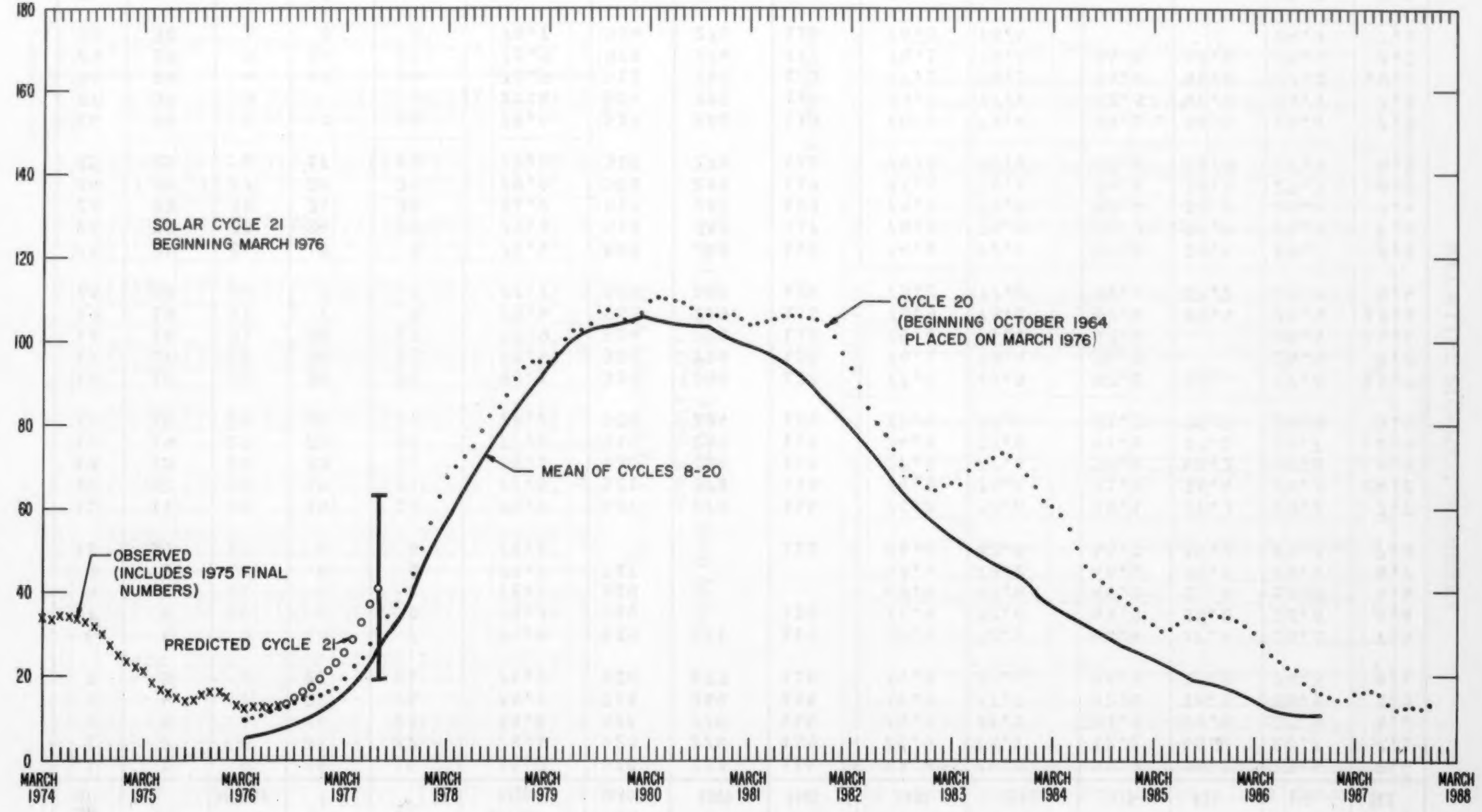
* adjusted for burst

DAILY SOLAR INDICES

JANUARY 1977

JAN 1977	YEAR DAY	BARTELS 27-DAY CYCLE NUMBER	SUNSPOT NUMBERS R_Z	SUNSPOT NUMBERS $R_{A'}$	OBSERVED FLUX OTTAWA 2800	SOLAR FLUX ADJUSTED TO 1 A.U. AFGL 15400	AFGL 8800	AFGL 4995	OTTAWA 2800	AFGL 2695	AFGL 1415	AFGL 606	AFGL 410	AFGL 245
1	1	4	20	15	76.3	520	273	114	73.8	74.8	51.9	38.2	23.5	6.6
2	2	5	32	32	79.1	523	274	119	76.5	78.1	52.2	40.4	22.7	7.1
3	3	6	25	28	78.6	526	270	116	76.0	77.1	51.8	39.8	22.9	8.0
4	4	7	22	26	78.1	518	269	115	75.5	77.7	52.6	38.9	25.5	8.0
5	5	8	21	21	76.5	524	273	116	74.0	75.4	50.8	38.9	24.3	8.1
6	6	9	13	7	74.9	519	271	114	72.4	72.1	48.6	37.8	23.3	7.5
7	7	10	0	0	73.8	510		115	71.4	72.0	43.0	34.2	23.0	6.0
8	8	11	0	0	72.0	510			69.6	68.4	46.0	31.4	16.3	6.4
9	9	12	0	0	70.7	517			68.4	70.2	46.0	35.3	20.4	6.7
10	10	13	0	0	71.1			110	68.8	72.0	46.0	36.8	20.3	7.3
11	11	14	14	12	73.6	517	270	116	71.2	72.6	49.1	37.3	20.2	7.7
12	12	15	19	21	77.5	521	270	118	74.9	76.6	51.9	38.4	26.3	14.2
13	13	16	23	21	80.1	532	268	118	77.5	77.8	52.0	40.3	30.0	14.6
14	14	17	22	20	77.0	514	284	118	74.5	75.0	51.9	37.1	25.7	10.8
15	15	18	20	20	78.2	520	284	120	75.6	75.8	51.2	35.5	24.5	8.6
16	16	19	18	22	80.1	519	286	123	77.5	80.3	52.2	38.4	27.8	11.7
17	17	20	30	22	78.6	522	285	120	76.1	79.4	51.3		24.9	8.2
18	18	21	26	18	77.9	514	276	118	75.4	76.0	52.4		25.5	11.1
19	19	22	7	3	79.4	513	279	118	76.9	79.0	52.4	39.4	25.4	10.1
20	20	23	0	0	77.7	528	285	120	75.2	77.2	51.0	37.2	22.7	8.4
21	21	24	15	9	76.4	523	280	112	74.0	72.7	50.9	38.4	25.7	8.0
22	22	25	24	29	79.3	518	282	117	76.8	76.9	52.3	38.4	26.9	7.6
23	23	26	34	34	81.2	517	282	120	78.7	78.9	52.4	38.5	25.4	8.4
24	24	27	35	33	79.9	523	285	119	77.4	78.8	54.8	39.9	25.3	8.0
25	25	1	17	20	77.3	515	275	115	74.9	75.0	52.8	38.9	27.8	6.9
26	26	2	8	16	78.4	517	280	119	76.0	78.4	55.1	38.9	25.6	7.5
27	27	3		6	77.6	524	272	118	75.3	77.1	52.8	42.6	24.3	7.8
28	28	4	13	14	79.5	513	280	120	77.1	78.1	55.3	40.6	27.3	10.2
29	29	5	11	11	78.5	521	274	117	76.1	78.4	54.8	40.6	26.4	8.2
30	30	6	8	9	78.7	514	270	118	76.3	78.4			24.0	7.3
31	31	7	10	10	82.0	519	283	122	79.6	82.9			25.2	7.6
MEAN			15.7	15.5	77.4	519	277	117	74.9	79.2	51.4	38.2	24.7	8.5

* Adjusted for burst.



PREDICTED AND OBSERVED SUNSPOT NUMBERS

SMOOTHED OBSERVED AND PREDICTED SUNSPOT NUMBERS
CYCLE 21

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1976	15.5	13.4	12.5	13.0	12.9	12.6	13.2	13.9 (1)	15.0 (2)	16.2 (3)	17.5 (4)	19.5 (6)
1977	21.4 (7)	23.2 (9)	25.9 (11)	29.2 (13)	33.2 (17)	37.5 (19)	41.4 (22)	45.0 (25)	48.6 (28)	52.7 (32)	57.2 (36)	62.0 (39)
1978	67.3 (43)	73.4 (48)	78.5 (51)	82.3 (55)	85.4 (58)	88.2 (61)	91.8 (63)	96.9 (63)	102.8 (67)	107.7 (69)	113.3 (71)	118.5 (72)
1979	122.0 (74)	124.4 (75)	127.5 (79)	131.3 (83)	134.4 (84)	135.9 (86)	136.1 (87)	136.3 (87)	135.5 (87)	133.8 (85)	132.9 (82)	132.9 (78)
1980	134.0 (78)	134.6 (77)	134.3 (73)	133.3 (70)	131.5 (68)	130.6 (66)	130.8 (65)	130.3 (65)	131.2 (64)	133.6 (65)	132.9 (55)	129.5 (63)
1981	126.1 (61)	124.0 (60)	123.0 (57)	123.6 (55)	125.2 (53)	126.2 (51)	125.7 (50)	123.7 (47)	120.3 (45)	115.6 (43)	112.2 (42)	110.2 (41)
1982	108.6 (39)	106.4 (37)	102.7 (36)	97.3 (35)	91.5 (33)	87.5 (30)	81.8 (27)	78.2 (25)	74.9 (24)	71.8 (23)	70.4 (22)	69.6 (22)
1983	68.4 (21)	66.7 (21)	64.7 (21)	64.2 (22)	64.5 (22)	64.2 (23)	64.2 (24)	64.2 (25)	63.7 (25)	62.6 (25)	60.2 (25)	57.0 (25)
1984	53.7 (25)	51.6 (27)	50.9 (28)	49.3 (29)	46.8 (29)	45.1 (29)	43.4 (27)	42.0 (26)	40.9 (25)	39.9 (25)	38.9 (24)	38.1 (23)
1985	37.7 (23)	36.8 (23)	35.1 (22)	33.6 (21)	32.8 (20)	32.2 (19)	32.0 (20)	31.2 (20)	30.9 (20)	31.5 (20)	31.6 (19)	30.9 (18)
1986	29.5 (17)	27.9 (16)	26.4 (15)	24.8 (15)	23.6 (14)	22.7 (13)	21.7 (11)	21.1 (10)	20.0 (9)	18.8 (8)	18.2 (8)	17.9 (9)
1987	18.2 (10)											

For each month, the upper figure is the observed or predicted Zürich smoothed sunspot number. The lower figure in parenthesis is the corresponding absolute value of the 90% prediction interval, an indication of the uncertainty above and below the predicted number. Observed numbers are those with no prediction intervals. The observed smoothed sunspot numbers are based on final Zürich numbers through 1975.

This prediction for the new sunspot cycle is based on the assumption that the provisional smoothed sunspot number of 12.5 in March 1976 is the minimum number. The prediction will change if a lower smoothed number occurs.

Hα SOLAR FLARES

JANUARY 1977

OBSERVATORY	OBSERVED UT DATE JAN	OBSERVED UT START	OBSERVED UT MAX. PHASE	OBSERVED UT END	LOCATION APPROX. LAT.	LOCATION APPROX. MER. DIST.	LOCATION CENTRAL DISTANCE	LOCATION McMATH PLAGE REGION	LOCATION CMP DAY	DURATION — MIN.	IMPORTANCE	OBS. COND.	OBS. TYPE	MEASUREMENTS TIME — UT	MEASUREMENTS MEAS. AREA Mil. of Disk	MEASUREMENTS CORR. AREA Sq. Deg.	REMARKS
KODA	03	0218E	0221	0329	N31	W53	.878	14591	29.1	71D	1N		V	0218	250	2.6	EH
MCMA	04	1719	1723	1734D	S23	W74	.960	14579	29.2	15D	1N		C	1723	60	2.4	EH
RAMY	04	1722	1726U	1728D	S22	W71	.945		29.4	6D	SB	3	C		97		FDE
RAMY	04	1728E	1730	1756	S21	W69	.934		29.6	28D	SB	4	V		90		
BUCA	05	0805		0830	N34	W80	.994		29.3	25	SN		P	0805	53	.5	CE
RAMY	11	1328	1340	1350	S28	E12	.460		12.5	22	SF	3	C		40		F H
RAMY	11	1332E	1336U	1348D	S28	E13	.466		12.5	16D	SF	4	V		31		H
HTPR	12	1302	1302	1305	S29	W04	.442		12.2	3	SF		C	1302	20		E
RAMY	12	1316	1323	1345D	S27	W 5	.414		12.2	29D	SN	4	C		105		F
RAMY	12	1318E	1335	1350	S27	W 5	.414		12.2	32D	SN	4	V		190		F
HTPR	12	1321	1330	1400	S29	W06	.448		12.1	39	SN		C	1330	40		E
MCMA	12	1753	1807	1850D	S28	W06	.433	14607	12.3	57D	SB		C	1807	125	1.4	E
MCMA	12	1951E		2006D	S28	W06	.433	1 607	12.4	15D	SN		C	1951	60	.7	E
PALE	12	2214E	2216U	2218D	S29	W 8	.455		12.3	4D	SF	3	C		16		U
PALE	13	0111E	0113U	0131D	S30	W 8	.471		12.4	20D	SF	3	C		69		U
HTPR	13	0901	0912	0920	S28	W17	.498		12.1	19	SF		C	0912	20		E
HTPR	13	1019	1022	1030	S28	W18	.506		12.1	11	SF		C	1022	10		
HTPR	13	1206	1207	1211	S28	W18	.506		12.2	5	SF		C	1207	10		
HTPR	13	1219	1226	1230	S28	W20	.523		12.0	11	SF		C	1226	10		
HTPR	13	1329	1332	1342	S31	W17	.535		12.3	13	SF		C	1332	20		
HTPR	13	1414	1418	1433	S26	W19	.491		12.2	19	SF		C	1418	10		
HTPR	13	1423	1425	1427	S28	W18	.506		12.2	4	SF		C	1425	20		E
HTPR	13	1455	1458	1505	S28	W19	.514		12.2	10	SF		C	1458	20		
HTPR	16	0831	0836	0841	S26	W57	.861		12.1	10	SF		C	0835	10		
HTPR	17	1232	1237	1240	S29	W70	.948		12.3	6	SF		C	1237	10	.2	
HTPR	17	1242	1245	1249	S29	W70	.948		12.3	7	SF		C	1245	10	.2	
HTPR	17	1332	1336	1342	S29	W70	.948		12.3	10	SF		C	1336	20	.4	E
HTPR	17	1414	1419	1421	S29	W71	.952		12.3	7	SF		C	1419	20	.4	E
CATA	24	0755	0755	0805	N27	W37	.716		21.6	10	SN	2		0755	67	1.0	

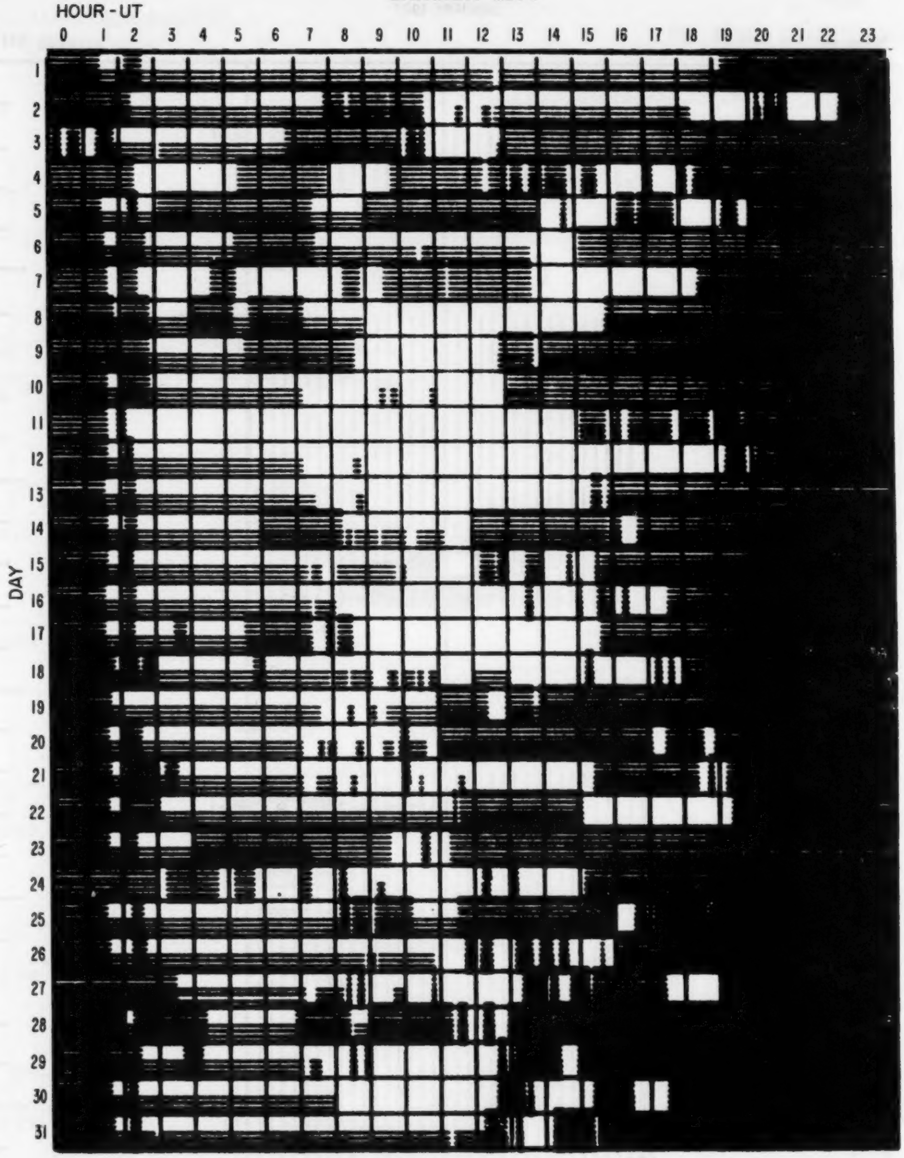
"Remarks":

A = Eruptive prominence whose base is less than 90° from central meridian.
B = Probably the end of a more important flare.
C = Invisible 10 minutes before.
D = Brilliant point.
E = Two or more brilliant points.
F = Several eruptive centers.
G = No visible spots in the neighborhood.
H = Flare accompanied by a high speed dark filament.
I = Active region very extended.
J = Distinct variations of plage intensity before or after the flare.
K = Several intensity maxima.
L = Existing filaments show signs of sudden activity.
M = White-light flare.
N = Continuous spectrum shows effects of polarization.
O = Observations have been made in the calcium II lines H and K.
P = Flare shows helium D_3 in emission.
Q = Flare shows the Balmer continuum in emission.
R = Marked asymmetry in Hα line suggests ejection of high velocity material.
S = Brightness follows disappearance of filament (same position).
T = Region active all day.
U = Two bright branches, parallel (||) or converging (Y).
V = Occurrence of an explosive phase: important and abrupt expansion in about a minute with or without important intensity increase.
W = Great increase in area after time of maximum intensity.
X = Unusually wide Hα line.
Y = System of loop-type prominences.
Z = Major sunspot umbra covered by flare.

INTERVALS OF NO FLARE PATROL OBSERVATION

FOR PRECEDING SOLAR FLARE TABLE

JANUARY 1977



Observatories included in total patrol:

Athenes	Catania	Herstmonceux	Kodaikanal	Palehua	Tehran
Bucharest	Haute Provence	Istanboul	McMath-Hulbert	Ramey	Upice
					Wendelstein

Times of no flare patrol are shown by the shaded area for each day divided into times of no cinematographic patrol (bottom half of day) and times of neither visual nor cinematographic patrol (top half of day).

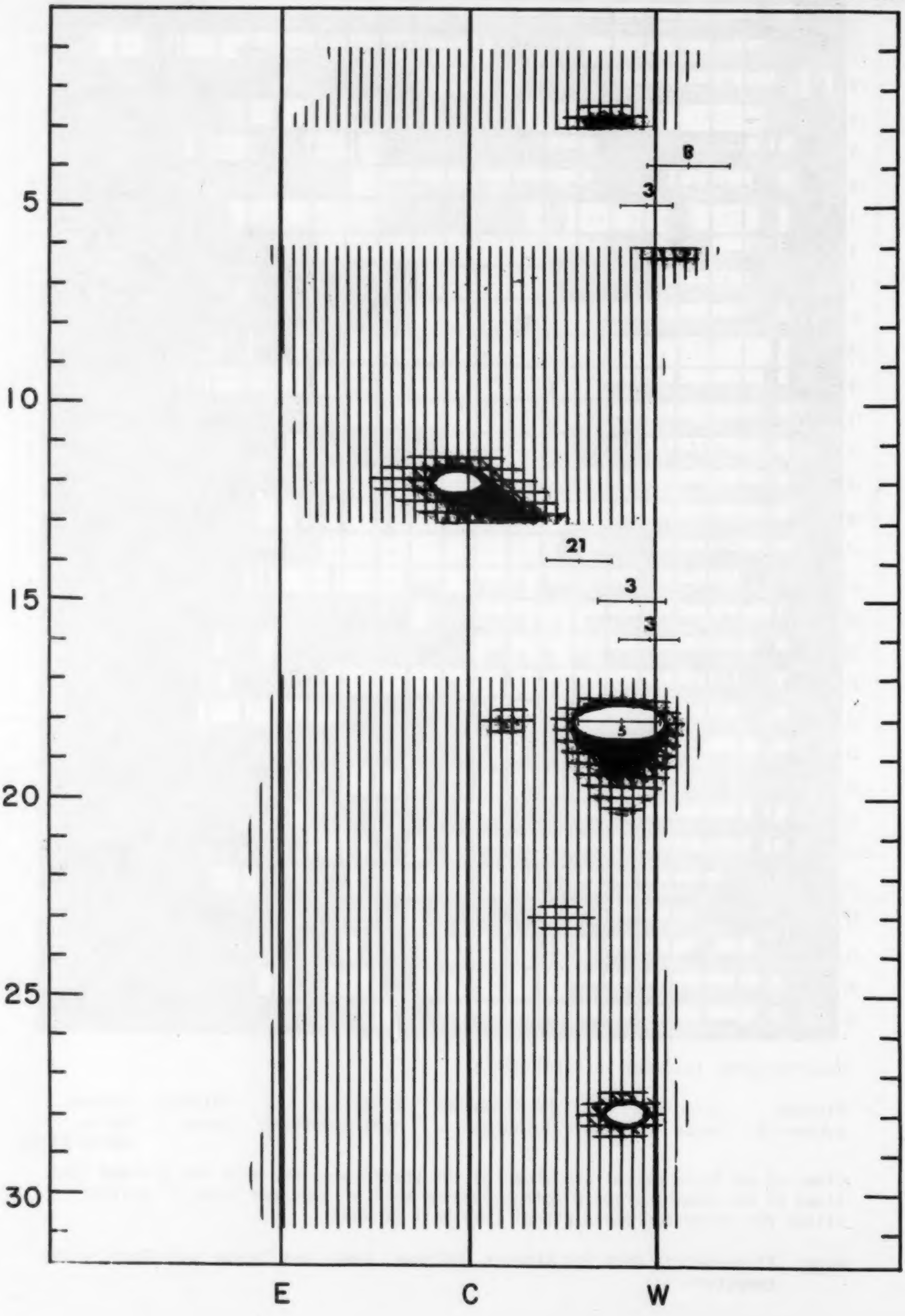
Note: Flare patrol data for Athenes, Palehua, Ramey and Tehran were lost by the computer.

SOLAR RADIO EMISSION
INTERFEROMETRIC OBSERVATION

JANUARY 1977

Nançay

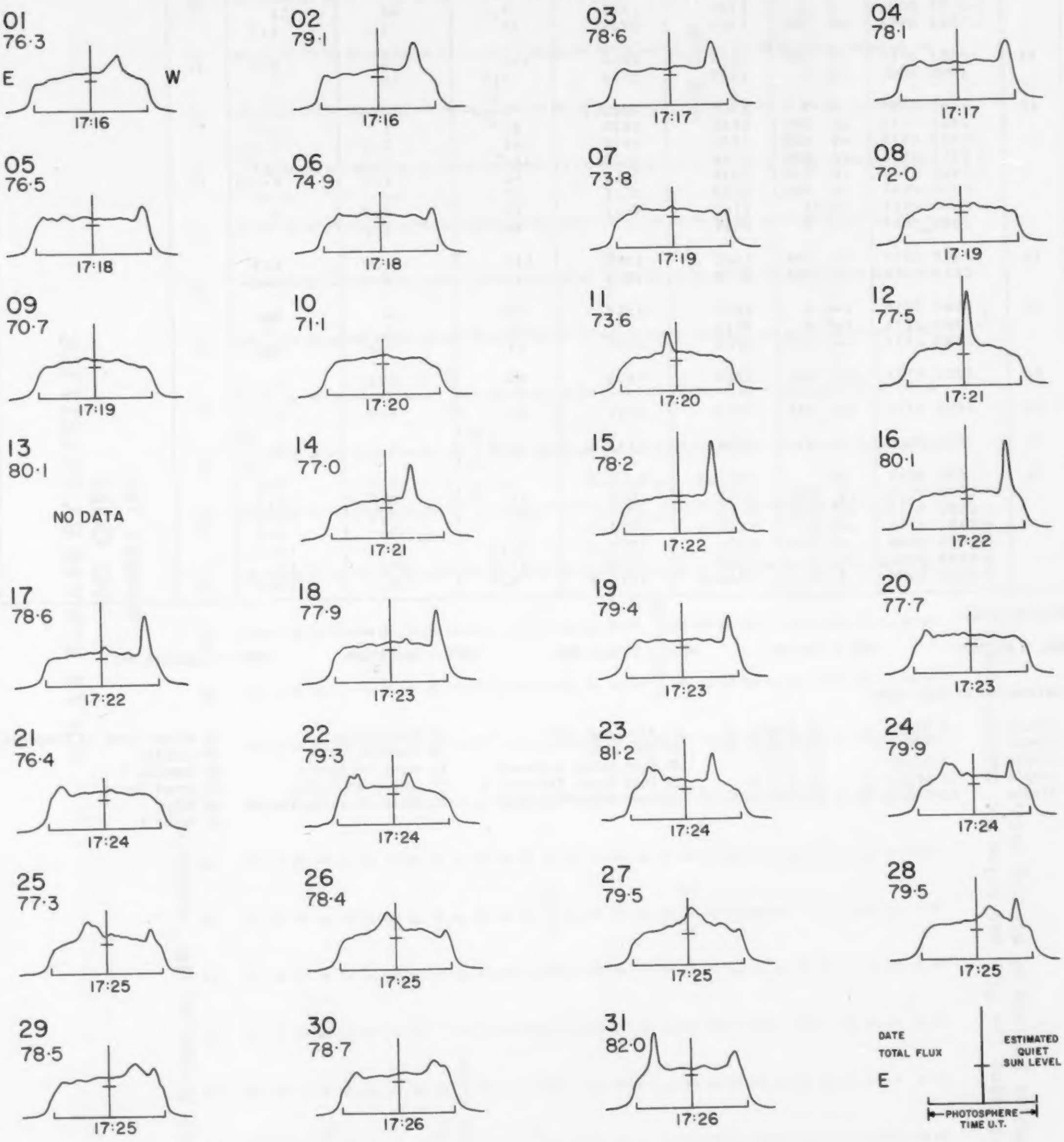
169 MHz



EAST-WEST SOLAR SCANS
JANUARY 1977

ALGONQUIN RADIO OBSERVATORY
CANADA

10·7cm
Fan Beam with 1·5 minutes of arc
E-W Resolution



SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS

JANUARY 1977

	FREQUENCY STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY $10^{-22} Wm^{-2} Hz^{-1}$ PEAK	MEAN	INT	REMARKS
4	2800 OTTA	3 S	1720	1721.5	4	38	12.4		
	2695 BOUL	8 S	1721	1722	3.5	32	11		
	2800 OTTA	29 PBI	1724	1724	36	1.4	0.7		
11	2800 OTTA	20 GRF	1515	1640	135	1	0.5		
	2695 BOUL	45 C	1857	1858	6.5	16	5		
12	2695 SGMR	1 S	1320.6	1321.8	9.4U	7.4	4 U		
	2800 OTTA	20 GRF	1530	1635	80	1	0.7		
	2800 OTTA	41 SER	1700	1620	190	3.2	1.6		
	2800 OTTA	20 GRF	1700	1820	150	3.2	1.6		
	2800 OTTA	20 GRF	1930	2010	40	1.8	0.9		
	2695 PENT	32 ABS	2013	2115	97	-2	-1.2		
	2695 PENT	24OFR	2157	2217	20	3.2	2		
	2695 PENT	24P R	2217		40 D	3.2			
15	2800 OTTA	20 GRF	1425	1450	115	1.4	0.9		
	2800 OTTA	20 GRF	1700	1935	180	2.6	1.8		
16	2800 OTTA	24O R	1425	1510	45	1	0.5		
	2800 OTTA	24P R	1510		480 D	1			
	2800 OTTA	20 GRF	1728	1733	12	0.4	0.2		
17	2800 OTTA	20 GRF	1820	1850	80	0.8	0.4		
23	2800 OTTA	20 GRF	1710	1720	40	0.8	0.4		
24	2695 BOUL	3 S	1630	1831.5	2.5	6	2		
31	2695 MANI	2	0621.1	0623.9	9.7	6.3	2.1		
	2800 OTTA	20 GRF	1625	1635	17	0.6	0.3		
	2800 OTTA	21 GRF	1715	1750	215	4.4	1.9		
	2800 OTTA	46F C	1726.5	1728.9	18	43	9.9		
	2695 SGMR	4 S/F	1726.6	1728.8	14.4	36	14.4		
	2695 BOUL	45 C	1727	1729	17.5	39	12		
	8800 SGMR	3 S	1728.5	1729.7	9.7	39.6	13.3		

Observatories:

BOUL = Boulder MANI = Manila OTTA = Ottawa ARO PENT = Penticton SGMR = Sagamore Hill

Explanation of Type Code:

1 Simple 1
2 Simple 1F
3 Simple 2
4 Simple 2F
5 Simple
6 Minor
7 Minor +
8 Spike
20 Simple 3
21 Simple 3A
22 Simple 3F
23 Simple 3AF
24 Rise
25 Rise A
26 Fall
27 Rise and Fall
28 Precursor
29 Post Burst Increase
30 Post Burst Increase A
31 Post Burst Decrease
32 Absorption
40 Fluctuation
41 Group of Bursts
42 Series of Bursts
43 Onset of Noise Storm
44 Noise Storm in Progress
45 Complex
46 Complex F
47 Great Burst
48 Major
49 Major +

SOLAR X-RAYS BY SATELLITE
SMS GOES
JANUARY 1977

.5 - 4Å Hourly Averages (10^{-5} watts/m^2)

MO DA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Mean
1/ 1	B	B	B	B	M	M	B	B	B	B	B	B	B	0.02	B	B	B	B	0.01	B	B	B	B	B	B
1/ 2	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	0.16	B	B	M	B	B	B	B	B	B
1/ 3	B	B	B	B	B	B	B	B	B	M	M	M	M	M	M	B	B	M	B	B	B	B	B	M	B
1/ 4	B	0.01	B	B	M	M	B	B	B	B	B	B	B	B	B	B	M	B	B	B	B	B	M	B	B
1/ 5	B	B	B	B	M	M	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	M	B	B
1/ 6	B	B	B	B	M	M	B	B	B	B	B	B	B	B	B	B	B	M	M	B	B	B	B	M	B
1/ 7	B	B	B	B	M	M	B	B	B	B	B	P	B	B	B	B	B	B	B	B	B	B	B	0.01	B
1/ 8	B	B	B	B	M	M	B	B	B	B	B	B	B	B	B	B	B	M	M	B	B	M	M	M	B
1/ 9	0.03	0.04	B	M	M	M	B	B	B	B	B	B	B	B	B	B	B	B	M	B	B	B	B	B	B
1/10	0.02	0.02	0.09	B	M	M	B	B	B	B	B	B	0.02	B	0.03	B	B	M	B	B	B	B	M	B	B
1/11	B	B	B	B	B	B	B	B	B	B	B	B	0.05	0.02	B	B	B	B	B	B	B	B	B	B	B
1/12	B	B	B	B	M	M	B	B	B	B	B	B	B	B	B	B	B	B	B	0.01	B	B	0.02	B	B
1/13	B	0.02	B	B	M	B	B	B	B	B	B	B	B	B	B	B	M	M	M	B	B	B	B	B	B
1/14	B	B	B	B	B	0.02	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
1/15	B	B	B	B	B	B	B	B	B	B	B	B	B	B	M	B	B	B	B	B	B	B	B	B	B
1/16	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
1/17	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	0.13	B	B	B	B	B	B	B	B
1/18	B	B	B	B	M	M	M	B	B	B	B	B	B	B	B	B	B	M	M	M	M	M	B	M	B
1/19	B	B	B	M	M	M	M	B	B	0.03	0.36	B	0.24	B	B	B	B	M	M	B	B	M	M	B	0.04
1/20	B	B	B	B	M	0.02	B	B	B	B	B	B	B	B	B	B	B	B	M	M	M	M	M	0.03	B
1/21	B	B	B	B	M	M	B	B	B	B	B	B	B	B	B	B	B	B	B	0.03	0.08	B	B	B	B
1/22	B	B	B	M	M	M	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	M	B
1/23	0.05	B	B	B	M	B	B	B	B	B	B	B	B	B	B	0.02	B	B	B	B	B	B	B	B	B
1/24	B	B	B	B	M	M	B	B	B	B	B	B	B	B	B	B	B	M	M	B	B	B	M	M	B
1/25	B	B	B	M	M	M	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	M	M	B
1/26	B	B	B	M	M	M	B	B	B	B	B	M	B	B	B	B	B	M	M	B	B	M	M	B	B
1/27	B	B	B	M	M	M	B	B	B	B	B	B	B	B	B	B	B	B	M	B	B	B	B	M	B
1/28	B	B	B	B	M	B	B	B	B	B	B	P	B	B	B	B	B	B	B	B	B	M	B	B	B
1/29	B	B	B	B	M	M	B	B	B	B	B	B	B	B	B	B	B	M	M	B	B	M	M	B	B
1/30	B	B	M	M	M	M	B	B	B	B	B	B	B	B	B	B	B	B	P	B	B	B	B	B	B
1/31	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	0.02	B	B	B	M	M	B	B

Note: "B" indicates the flux was below the cut-off levels.
"M" denotes periods of missing data.

SOLAR X-RAYS BY SATELLITE
SMS GOES
JANUARY 1977

1 - 8Å Hourly Averages (10^{-4} watts/m^2)

MO DA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Mean
1/ 1	B	B	B	B	M	M	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
1/ 2	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	M	B	B	B	B	B	B
1/ 3	B	B	B	B	B	B	B	B	B	M	M	M	M	M	M	B	B	M	B	B	B	B	B	M	B
1/ 4	B	B	B	B	M	M	B	B	B	B	B	B	B	B	B	B	M	B	B	B	B	B	M	B	B
1/ 5	B	B	B	B	M	M	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	M	B	B
1/ 6	B	B	B	B	M	M	B	B	B	B	B	B	B	B	B	B	B	M	M	B	B	B	B	M	B
1/ 7	B	B	B	B	M	M	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
1/ 8	B	B	B	B	M	M	B	B	B	B	B	B	B	B	B	B	B	M	M	B	B	M	M	M	B
1/ 9	0.12	0.13	0.07	M	M	M	B	B	B	B	B	B	B	B	B	B	B	B	M	B	B	B	B	B	0.01
1/10	0.10	0.09	0.17	B	M	M	B	B	B	B	B	B	0.09	0.02	0.08	B	B	M	B	B	B	B	M	B	0.02
1/11	B	B	B	B	0.05	B	B	B	B	B	B	B	0.10	0.08	0.06	B	B	B	B	B	B	B	B	B	B
1/12	B	B	B	B	M	M	B	B	B	B	B	B	B	B	B	B	B	B	0.01	0.01	B	B	0.02	B	B
1/13	B	0.02	B	B	M	B	B	B	B	0.01	B	B	B	B	B	B	M	M	M	B	0.01	B	B	B	B
1/14	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
1/15	B	B	B	B	B	B	B	B	B	B	B	B	B	B	M	B	B	B	B	B	B	B	B	B	B
1/16	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
1/17	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	0.51	B	B	B	B	B	B	B	0.01
1/18	B	B	B	B	M	M	M	B	B	B	B	B	B	B	B	B	B	M	M	M	M	M	B	M	B
1/19	B	B	B	M	M	M	M	0.01	0.45	1.37	0.29	0.08	0.06	B	B	B	B	M	M	B	B	M	M	B	0.09
1/20	B	B	B	B	M	B	B	B	B	B	B	B	B	B	B	B	B	B	M	M	M	M	M	0.05	B
1/21	B	B	B	B	M	M	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
1/22	B	B	B	M	M	M	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	M	B
1/23	B	B	B	B	M	B	B	B	B	B	B	B	B	B	B	0.02	B	B	B	B	B	B	B	B	B
1/24	B	B	B	B	M	M	B	B	B	B	B	B	B	B	B	B	B	M	M	B	B	B	M	M	B
1/25	B	B	B	M	M	M	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	M	M	B
1/26	B	B	B	M	M	M	B	B	B	B	B	M	B	B	B	B	B	M	M	B	B	M	M	B	B
1/27	B	B	B	M	M	M	B	B	B	B	B	0.03	B	B	B	B	B	B	M	B	B	B	B	M	B
1/28	B	B	B	B	M	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	M	B	B	B
1/29	B	B	B	B	M	M	B	B	B	B	B	B	B	B	B	B	B	M	M	B	B	M	M	B	B
1/30	B	B	M	M	M	M	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
1/31	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	0.22	B	B	B	M	M	B	B

<u>Note</u>: "B" indicates the flux was below the cut-off levels.
"M" denotes periods of missing data.

SOLAR X-RAYS BY SATELLITE

GOES-1

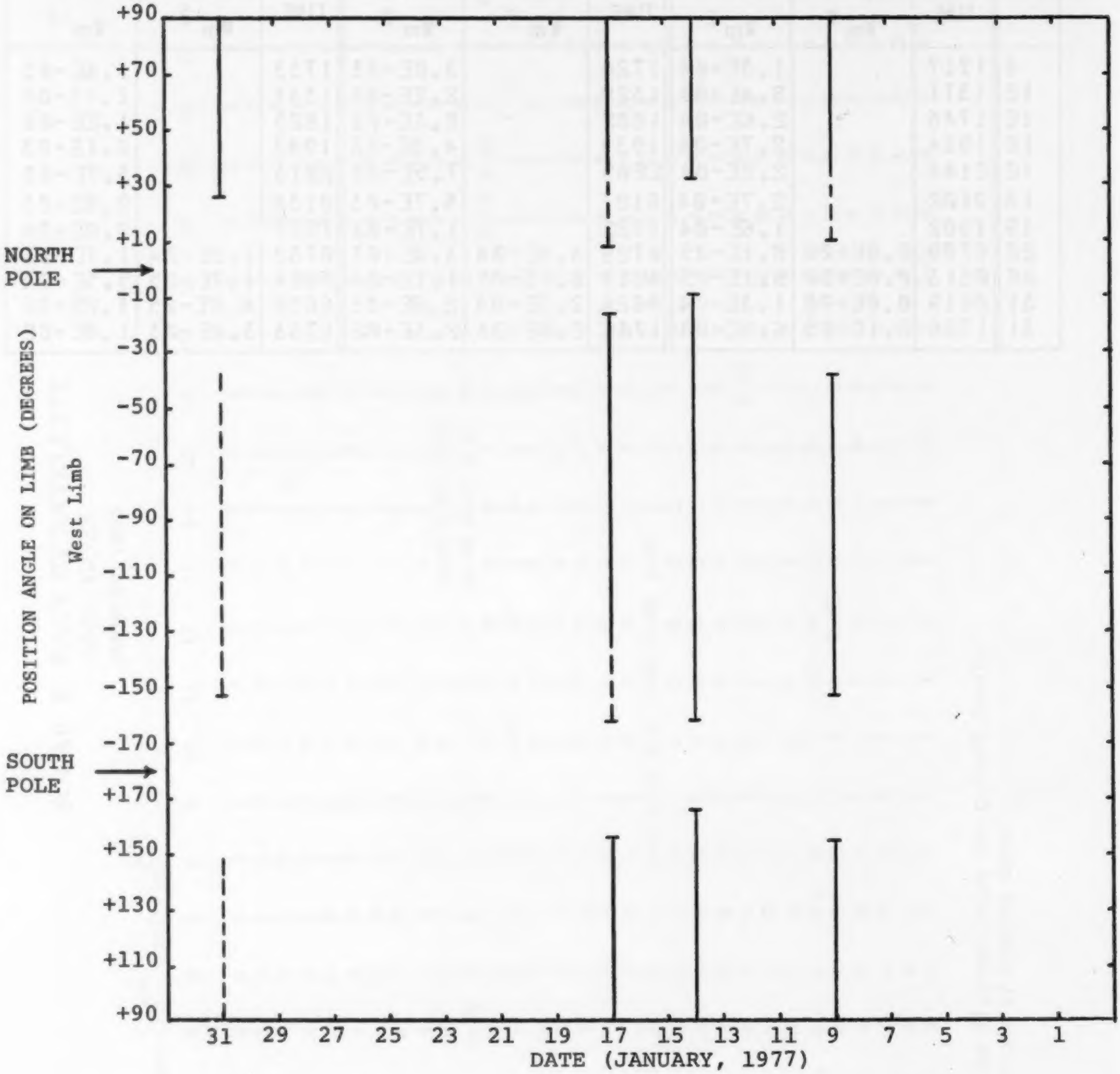
JANUARY 1977

DAY	BEGIN TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}	MAX TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}	1/2P TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}
4	1717		1.3E-04	1726		3.0E-03	1733		1.4E-03
12	1311		8.4E-05	1329		2.2E-03	1341		1.1E-03
12	1746		2.6E-04	1802		2.3E-03	1825		1.2E-03
12	1924		2.7E-04	1934		4.3E-03	1943		2.1E-03
12	2144		2.2E-04	2205		7.5E-03	2213		3.7E-03
13	0102		2.7E-04	0127		5.7E-03	0136		2.8E-03
19	1502		1.6E-04	1522		1.7E-03	1527		9.0E-04
28	0709	0.0E+00	8.1E-05	0728	4.4E-04	3.4E-03	0732	1.2E-04	1.7E-03
28	0813	0.0E+00	8.1E-05	0818	8.1E-05	1.1E-03	0824	1.7E-05	5.5E-04
31	0619	0.0E+00	1.3E-04	0626	2.5E-04	2.6E-03	0632	4.8E-05	1.2E-03
31	1726	2.1E-05	6.9E-04	1730	2.5E-03	2.3E-02	1733	3.4E-03	1.0E-02

CORONAL HOLES

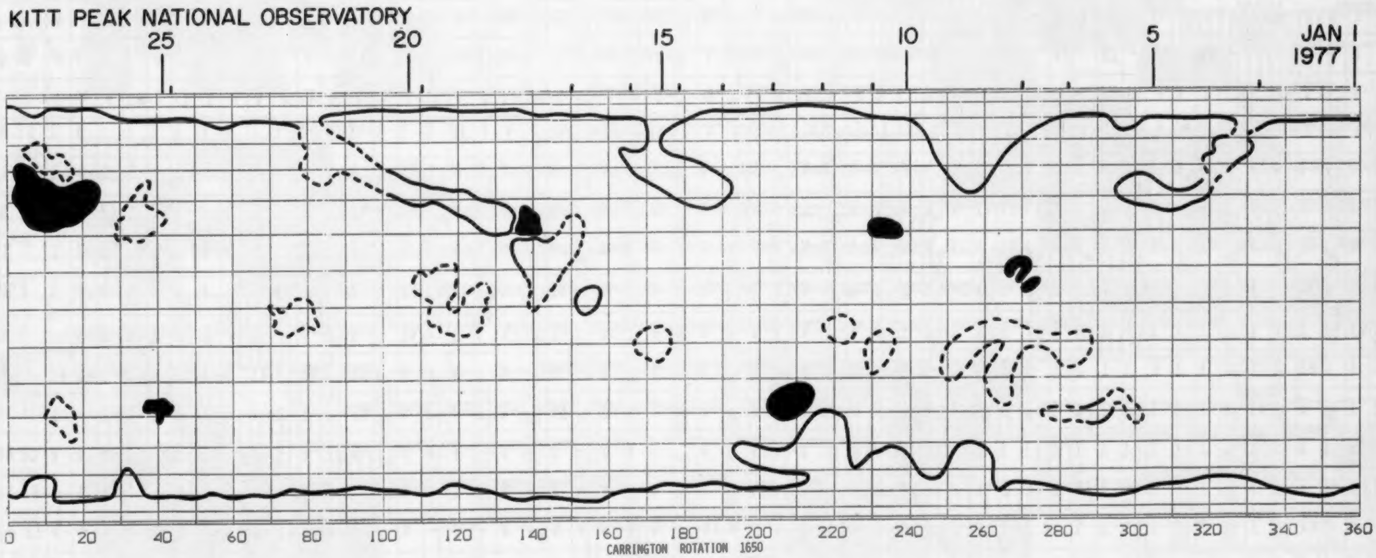
Helium D3 Chromosphere at Solar Limb

JANUARY 1977



HELIUM 10830Å SYNOPTIC MAPS

CARRINGTON ROTATION 1650



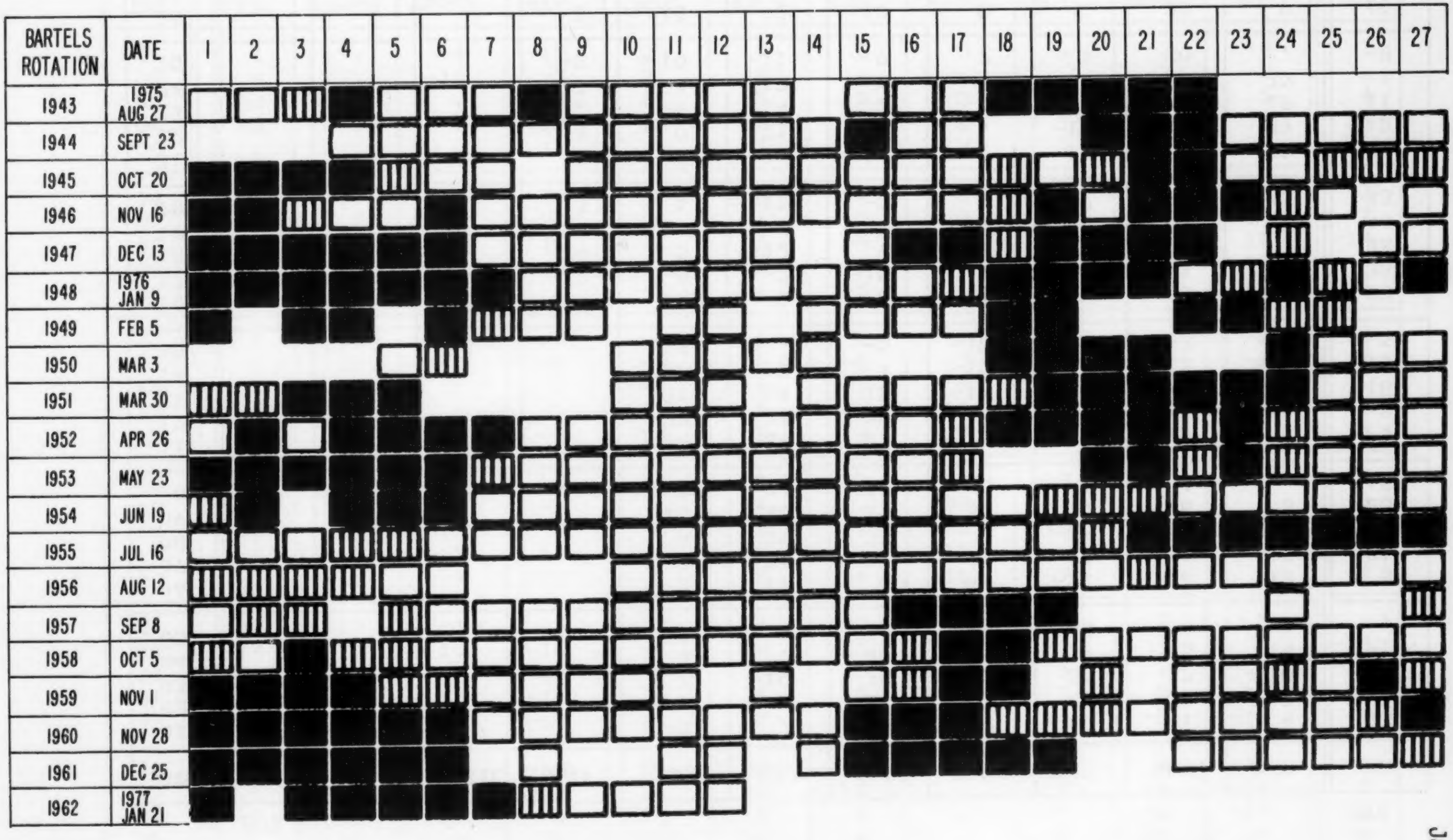
INFERRED IP MAGNETIC FIELD

BARTELS ROTATION	DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1943	AUG 31	A A	A A	TA A*	T T	A A	A A	TA A	T T*	A A	A A	A A	A A	A *	A A	A A*	A A*	A T	T T	T T	T -	T TA	T T	T T	T T	T T	A T	A A
1944	SEP 27	A A	T A	A A	A A	T T	T A	T -	A -	A -	A A*	A A	A A	A *	AT A	T T	A A	A A	AT *	T A	T T	T A	T T	T T	T T	T T	TA A	A -
1945	OCT 24	T T	T T	T T	T T	T TA	A A	A *	A A	A A	A A	A A*	A *	A A	A *	AT -	AT -	AT T	AT T	T T	T T	T T	T T	T A	T *	T T	T T	T T
1946	NOV 20	A T	A *	T T	TA T	T A	A T*	A T*	A A	A -	A -	A -	A A	A *	A *	A A	A A	A A	AT A	AT T	T T	T T	T T	T T	T *	T T	T T	T T
1947	DEC 17	T -	T T	T T	T T	T T	T T	TA *	A T	A T	A *	AT *	TA A	A A	A *	A A	A A	A A	T T*	T A	T *	T T	T T	T T	T A*	TA *	T *	T T
1948	1976 JAN 13	TA T	T T*	T TA	T T	TA A	TA T	AT T	A A	A T	A -	A -	A *	A A	A -	A -	A A	A -	A -	T T	T T	T T	T T	T T	T T	T T	TA T	T T
1949	FEB 9	T A	T A	T T	T -	T -	A T	T -	TA A	T A	AT A*	T T	A TA	A A	A A	A A	A T	A A	T T	T T*	T A	T T	T T	T T	T *	T A	T TA	TA *
1950	MAR 7	T A	T A	T T	T T	T T	T T	T -	T TA	A A*	A A	TA A	A A	A A	A A	A A	A A	* T	* T	AT T	T T	T T	T T*	T T	T T	T -	TA T	T T
1951	APR 3	T T	T T	T T	T T	T T	T T	T *	A A	A A	A A	A *	A A	A A	A A	A A	A A	A A	A A	AT A	TA T*	A T*	T T	T T	T *	AT T	TA A*	T T
1952	APR 30	T T	AT T	T T	T T	T T	T T	TA A	AT T*	A A	A -	A A	A A	A -	A -	A -	T T	A A	A A*	A TA	AT AT	T T	T T	A A*	T T	A A	T -	T T
1953	MAY 27	T -	T T	T T	T T	T T	T T	T *	TA T	A A	A A	A A	A T	A T	A -	T *	A A	A A	A -	T T	T A	T T	A A	T T*	A A	T A	A A	A A
1954	JUN 23	T T	T T	T T	T T	T T	AT A	T T	A A	AT A	A A	TA T*	AT A	A A	A A	A A	TA A*	T T	A A	A A	T T	T A	AT A*	A TA	AT AT	T A	A A	T A*
1955	JUL 20	T A	A T*	T T	A A	A A	A A	A A	A A	A A	TA A*	T T	A A	A A	T T	A A	A A	A A	T A	AT T*	TA TA	TA -	TA TA	A A	T T	T T	A A	A A
1956	AUG 16	A A	T T	T T	T T	A A	A A	TA T*	A A	A A	A A	A A	A A	A A	A A	A *	A A	AT A	A A	A A	A -	AT -	AT -	AT -	TA -	A -	A -	A -
1957	SEP 12	A -	T -	AT -	A -	T -	T -	A -	A -	A -	A -	AT -	A -	AT -	AT -	T -	AT -	T -	T -	T -	A -	A A	A A	AT A	A A	A -	T A	T A
1958	OCT 9	AT A	T A*	T A	T A*	T A	T *	A A	A A	A A	TA A	T A*	A A	A T	A *	A -	T -	T -	* T	A T	TA T	AT A	AT A	A -	A A	A A	AT A	T A
1959	NOV 5	T AT	TA T	T T	T T	T TA	A A	A T*	A T	A *	AT *	A A	A -	A A	A *	T -	T T	T T	T T	T T	T T	A A	A A	A A	A A	A A	A *	A A
1960	DEC 2	T A	T A	T T	T T	T T	T T	TA T	A T	A T	A T	A T	A T	A T	A A	AT T	T T	T *	T A	T A	T A	A A	- *	A A	A A	A -	TA -	A A
1961	DEC 29	A -	AT -	T *	T *	T *	T T	T T	AT A	A A	A A	T A	T *	T A	T T	T *	T A*	T T	T *	T *	T T	T T	A *	A A	A A	A A	A A	AT A
1962	1977 JAN 25	T A	T A	A -	A A	T T	A -	A -																				

T = towards the sun A = away from the sun * = effect doubtful or not discernible - = missing data

The table shows daily inferences of the polarity of the interplanetary magnetic field. The first half of the day is based principally on magnetograms produced by the magnetometer at the Vostok Antarctic Station of the USSR. The magnetometer of the U.S. Air Weather Service now operated at Thule by the Danish Meteorological Institute is used for the second half of the day.

STANFORD MEAN SOLAR MAGNETIC FIELD



POLARITY OF THE MEAN SOLAR MAGNETIC FIELD: [open box] = FIELD >2μT, [striped box] = -2μT ≤FIELD ≤2μT, [solid box] = FIELD <-2μT

STANFORD MEAN SOLAR MAGNETIC FIELD (MICROTESLAS)

	1975											1976
DAY	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.
01					-5	7	19	9	40	41	4	-23
02					.	2	33	-3	40	21	-2	-9
03					7	10	38	16	54	12	-10	.
04					2	.	40	42	57	5	14	-1
05					-2	13	11	46	45	0	-44	.
06					-2	17	0	36	-21	16	-12	6
07					3	21	17	46	20	-1	-10	21
08					6	29	39	.	14	-16	0	-15
09					16	30	11	30	.	-6	3	-25
10					23	26	16	8	.	4	.	-15
11					26	24	21	4	-23	6	4	-8
12					27	23	75	-8	-19	-1	-14	-9
13					21	14	17	-15	-9	0	-12	-18
14					20	9	4	-19	3	1	-22	-13
15					14	.	-5	-18	10	-3	-26	5
16				29	11	8	-8	-11	9	-8	-13	23
17				22	5	-2	-15	.	14	-1	-8	38
18				24	5	-12	.	.	7	2	3	36
19				24	.	-8	-25	.	-7	6	19	44
20				13	1	-11	-3	.	-17	-5	45	33
21				4	-3	-21	-11	.	-11	8	38	26
22				4	0	-21	-3	.	-15	17	39	12
23				.	-9	-14	2	.	0	31	19	11
24				-3	-4	-17	4	.	9	30	37	1
25				-5	-10	-11	9	7	3	30	.	-8
26				-3	-13	-2	10	8	.	29	9	-18
27				-14	-13	4	8	3	26	14	-3	-15
28				-16	-5	5	1	7	34	28	-9	-14
29				-6	9	10	-6	24	31	17	-1	4
30				-16	15	14	5	34	41	17	-17	-1
31				-10		17	19		47		-29	-2

STANFORD MEAN SOLAR MAGNETIC FIELD (MICROTESLAS)

	1976											1977
DAY	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.
01	1	•	-4	-15	20	17	8	5	•	-2	-4	•
02	4	•	-10	3	21	19	6	6	•	-3	-2	•
03	-3	•	•	13	15	15	0	2	-1	-4	5	4
04	-3	•	•	17	16	14	-8	8	1	1	13	15
05	•	•	•	13	6	7	-14	7	7	1	21	•
06	-9	19	•	22	8	-1	-10	6	-5	7	23	3
07	-12	0	10	20	0	-1	-5	3	0	16	25	-7
08	•	•	15	18	•	1	-4	-2	2	25	18	-14
09	-10	•	21	12	•	3	-3	1	6	23	13	-9
10	-2	•	•	8	-5	6	-5	•	13	14	8	-11
11	5	16	20	0	-3	6	2	0	19	•	-3	-8
12	8	21	20	-8	0	10	-1	2	21	5	-4	•
13	•	22	19	-7	-6	9	1	8	24	•	-7	•
14	7	21	9	-7	1	8	-2	12	29	4	-1	8
15	12	18	-2	-5	13	8	4	17	22	-2	0	6
16	•	•	-10	-2	16	5	7	20	19	-4	0	9
17	10	•	-14	-2	8	4	•	30	14	-3	6	6
18	10	•	-18	0	0	1	•	20	5	•	3	3
19	4	-10	-15	11	-6	0	•	15	-1	0	8	0
20	2	-11	-9	13	•	4	24	11	-9	•	6	-4
21	-11	-19	-3	6	-13	7	33	5	-5	13	5	•
22	-14	-17	10	-10	-7	14	33	-3	-1	11	1	-14
23	•	•	22	-18	-4	23	25	-12	6	2	-10	-12
24	•	•	22	-16	4	26	19	-10	12	5	-10	-12
25	-16	-8	3	-19	13	27	18	-6	14	-5	-14	-7
26	-17	5	-8	-18	28	30	16	•	20	0	-16	-6
27	0	2	21	-10	26	24	11	•	8	-6	-16	0
28	-2	5	-12	0	27	13	6	•	9	-6	-10	6
29	•	-1	-24	6	23	20	6	•	9	-12	-5	8
30		0	-17	16	25	15	8	4	4	-8	•	7
31		-4		17		12	1		-4		11	7

SOLAR WIND

Interplanetary Scintillations

JANUARY 1977

UCSD 74 MHZ SCINTILLATIONS

DAY	3C48 VEL	3C48 ERR	3C144 VEL	3C144 ERR	3C147 VEL	3C147 ERR	3C161 VEL	3C161 ERR	3C237 VEL	3C237 ERR	3C273 VEL	3C273 ERR	3C298 VEL	3C298 ERR	3C459 VEL	3C459 ERR
1											440	11	450	0		
2	343	6											395	6	400	10
3	317	21														
4															531	62
5	424	4									366	67	346	8	419	48
6	528	46	476	3			425	105			397	22	510	12		
7	495	18	458	3			427	15			319	32	395	3		
8			433	3			353	4					503	6		
9	488	88									403	14	534	36	265	10
9															283	23
10											422	36	613	94		
11	376	6									404	68	516	5	270	26
12	276	13	429	2			405	23	433	47			402	21	238	8
13	264	32											475	38		
14	325	26									234	32	316	38		
15	350	4					394	*							215	31
16	382	14													414	32
17	475	119	460	11											452	*
18	400	*	401	11											295	37
19	450	117	357	25							372	23	455	24	411	43
20	402	22	334	0							312	61	334	45		
21	421	1	381	28			417	87	334		299	65	446	4	330	17
22	477	42	360	8									288	20	309	63
23	462	12	410	80							362	13				
24	404	7					425	37			278	44				
25							612	7			563	74	506	58	291	64
26											366	56	260	21		
27	309	47											449	45	281	58
28	296	19	340	29									316	20	379	59
29	376	21	403	20			509	44			505	28	326	44	392	8
30	367	4					512	133			294	70	304	36	391	10
31	327	0	452	1			514	19					434	20	457	47

JANUARY	5 UT	5 LAT	5 DIST	5 DLON	15 UT	15 LAT	15 DIST	15 DLON	25 UT	25 LAT	25 DIST	25 DLON
3C48	3.	3.	1.13	-13.	2.	2.	1.08	-14.	1.	1.	1.04	-15.
3C144	7.	-3.	1.28	-5.	6.	-4.	1.26	-7.	5.	-5.	1.24	-9.
3C147	6.	2.	1.26	-3.	5.	1.	1.25	-5.	4.	1.	1.23	-8.
3C161	8.	-10.	1.27	-2.	7.	-10.	1.26	-5.	7.	-11.	1.24	-6.
3C237	11.	-5.	1.23	10.	11.	-6.	1.26	8.	10.	-6.	1.28	6.
3C273	13.	-3.	1.09	16.	13.	-4.	1.14	14.	12.	-5.	1.18	13.
3C298	15.	0.	0.98	17.	15.	0.	1.03	16.	14.	-1.	1.07	16.
3C459	24.	2.	0.91	-23.	23.	4.	0.83	-33.	23.	6.	0.72	-43

* indicates data for which no error estimates are available, since only two antennas were operating.

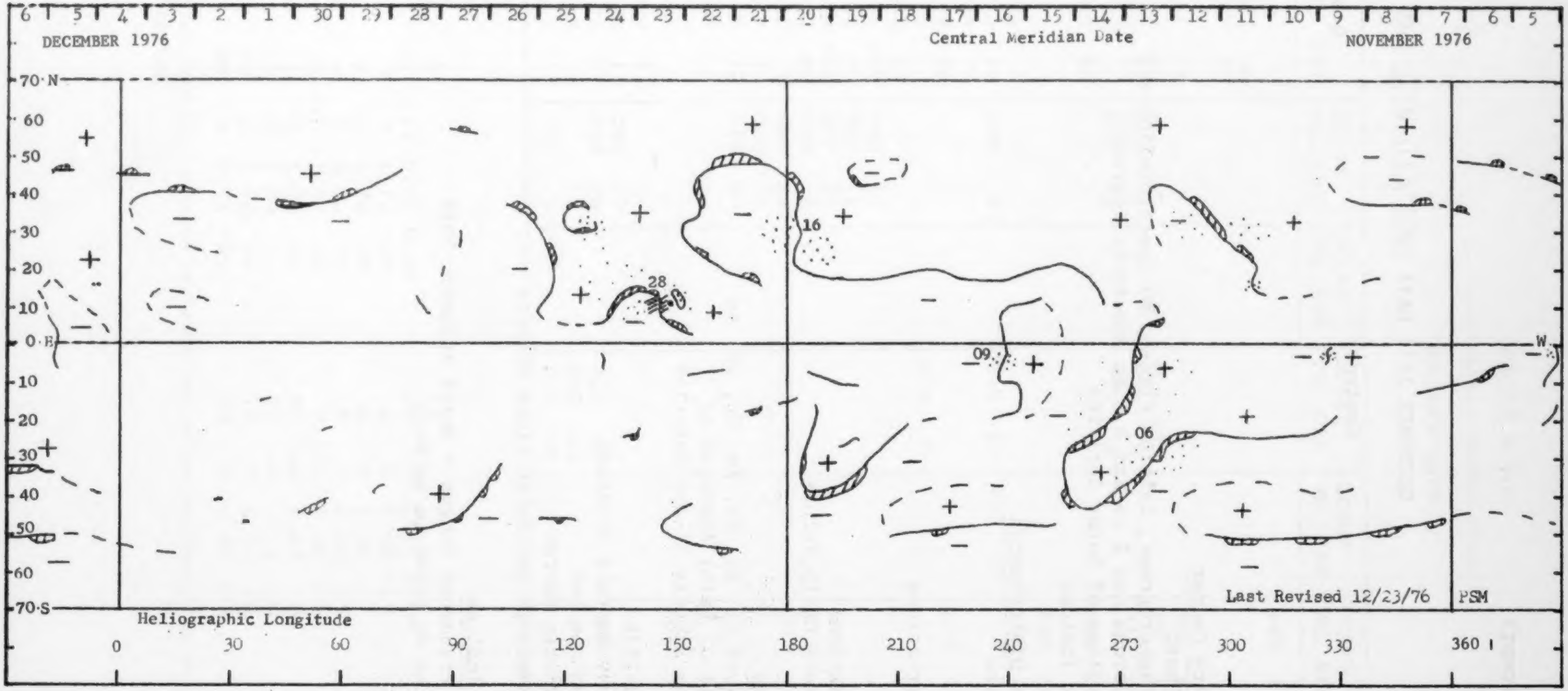
DECEMBER 1976 DATA

Contents

	Page
Daily Solar Activity Center	
Hα Synoptic Chart	26-27
X-ray, EUV, Magnetograms, Calcium Plages, Hα Spectroheliograms Sunspots, Corona and 2 cm and 8.6 mm Spectroheliograms	28-89
Individual Regions of Solar Activity	90-94
Daily Calcium Indices	95
Sudden Ionospheric Disturbances	
Table of Events	96
Solar Radio Waves	
Spectral Observations	97-101
Cosmic Rays	
Chart of Variations	102-105
Neutron Monitors Daily Values	106
Geomagnetic Indices	
Table of Indices Kp, Kn, Ks, Km, Cp, Ap, aa	107
12-Month Table of Daily Averages Ap	108
Chart of Kp by Bartels 27-day Rotation	109
Chart of C9	110
aa graph 1868-1976	111
Chart of Dst by Bartels Rotation	112
Equatorial Indices Dst	113
Principal Magnetic Storms	114
Sudden Commencements and Solar Flare Effects	115
Radio Propagation Indices	
Transmission Frequency Ranges - North Atlantic Path	116-117
Quality Indices on Paths to Germany	118

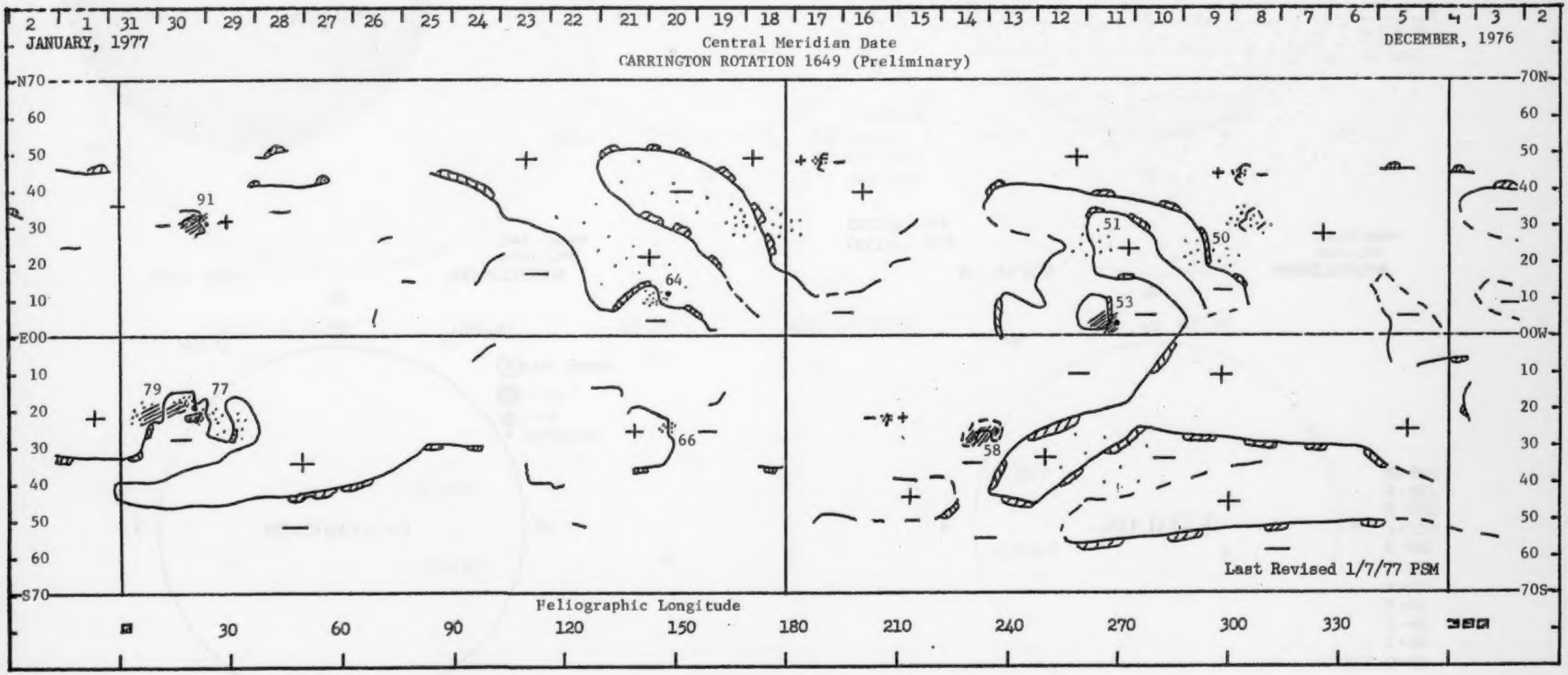
Hα SYNOPTIC CHART

CARRINGTON ROTATION 1648 (Preliminary)

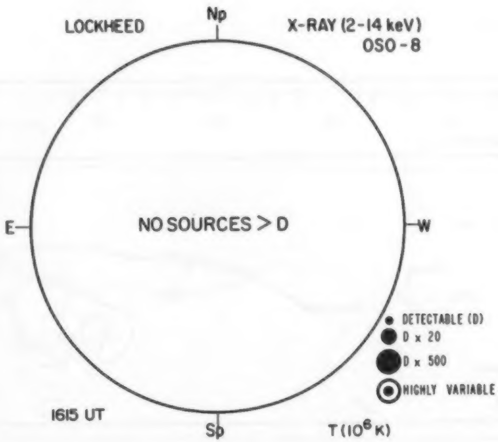


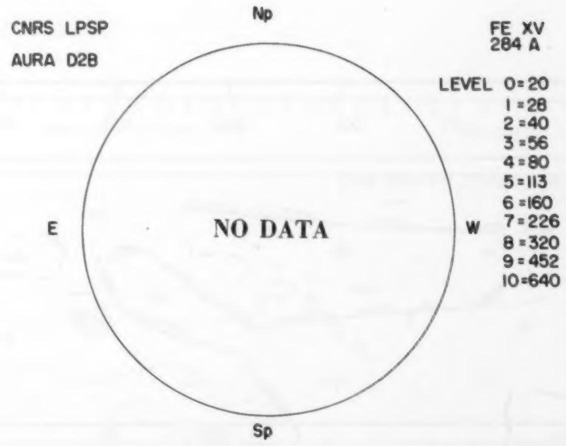
Hα SYNOPTIC CHART

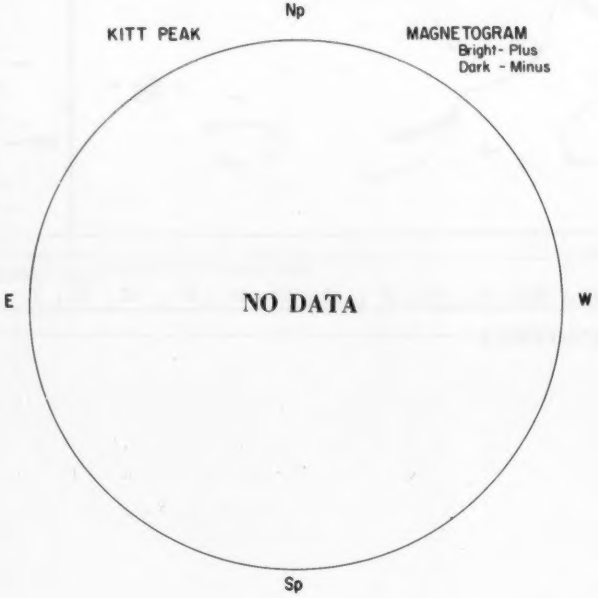
CARRINGTON ROTATION 1649 (PRELIMINARY)

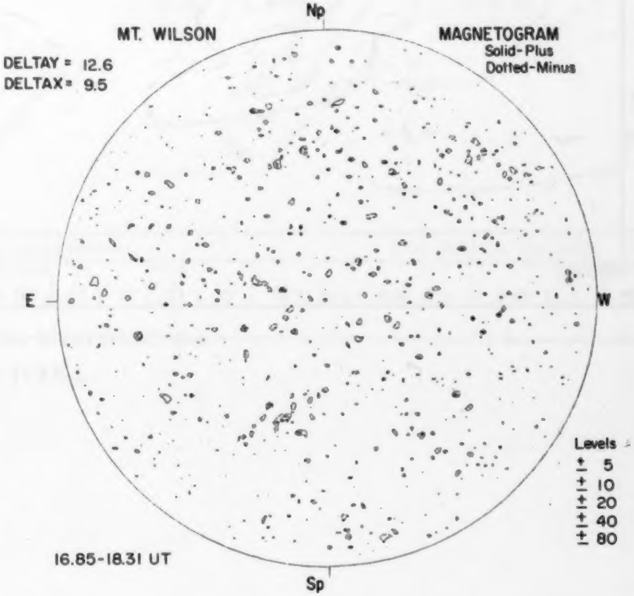


DECEMBER 1, 1976 (P =16.06, B_0 =0.82, L_0 =46.30)



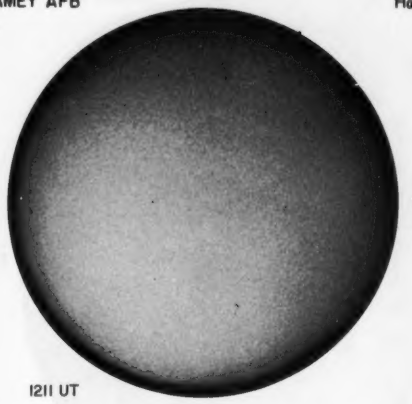




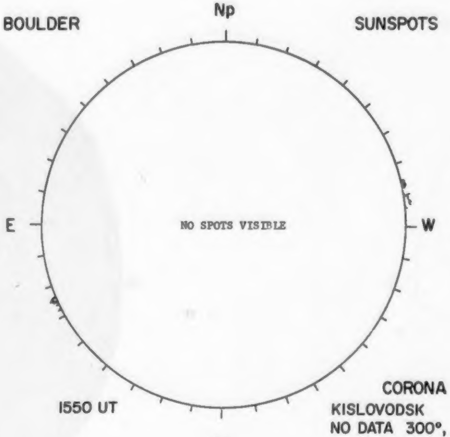


01

RAMEY AFB Hα

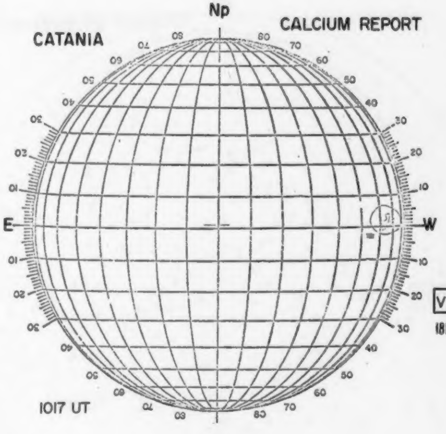


BOULDER SUNSPOTS



CORONA
KISLOVODSK
NO DATA 300°,
340°, 355°

CATANIA CALCIUM REPORT



V POOR | GD
181 -0870- - -

NELC LA POSTA 2.0 CM

Np

E W

NO DATA

WEATHER

Sp

---- UT

Ant. Temp. Unit 100°K

NELC LA POSTA 8.6 MM

Np

E W

NO DATA

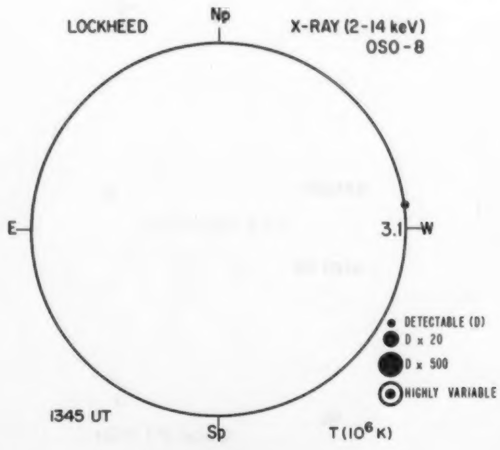
WEATHER

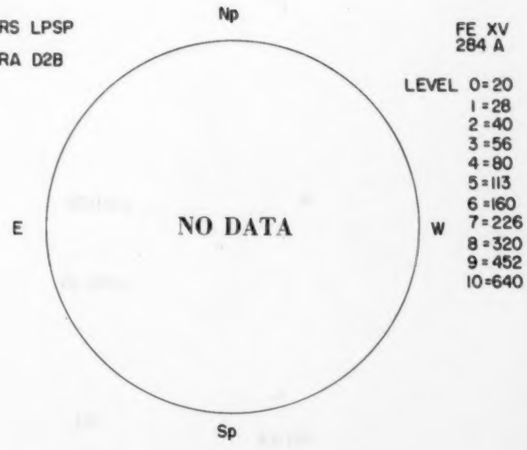
Sp

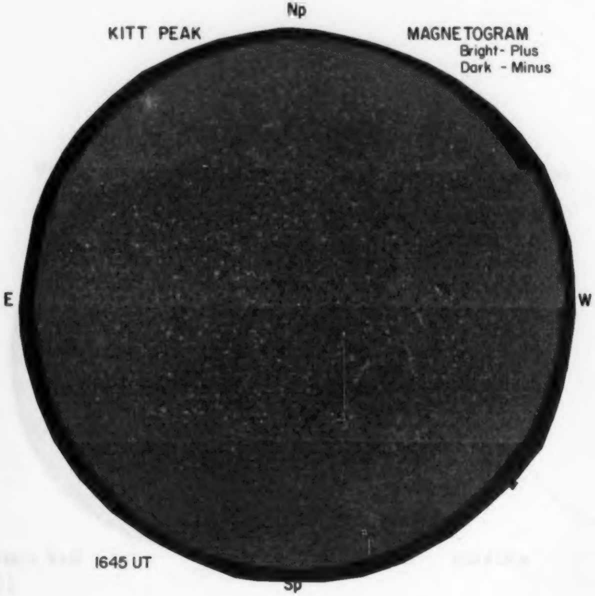
---- UT

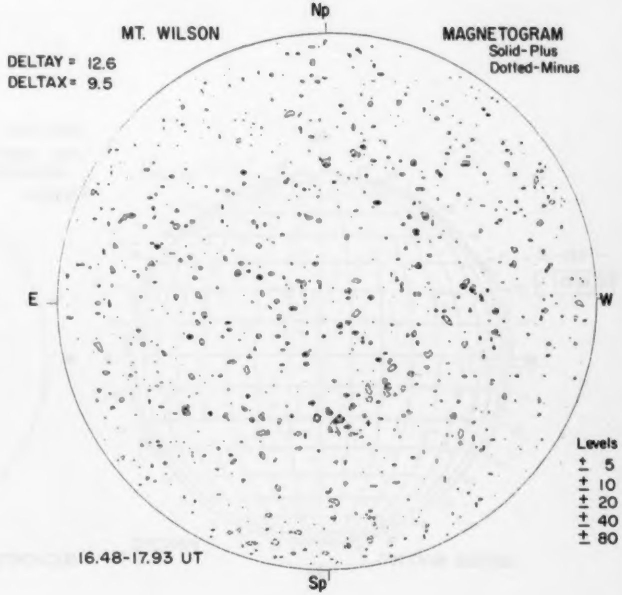
Ant. Temp. Unit 100°K

DECEMBER 2, 1976 (P =15.68, B_0 =0.69, L_0 =33.12)

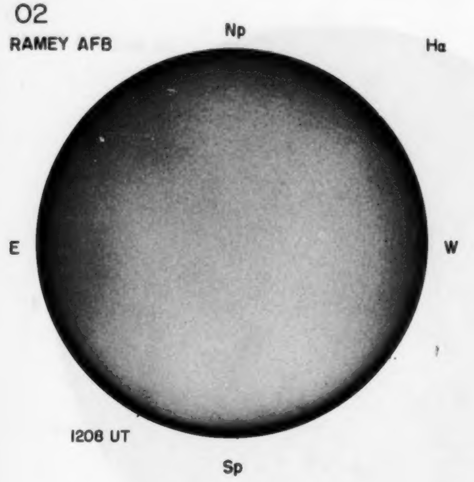


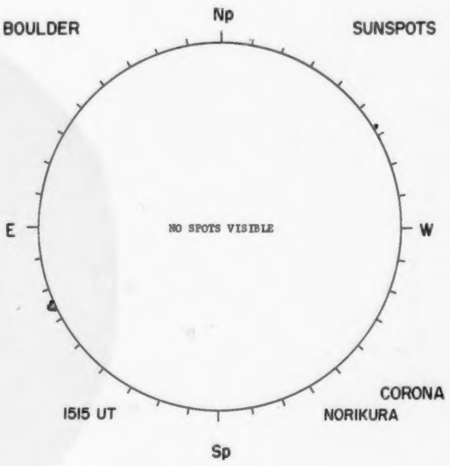


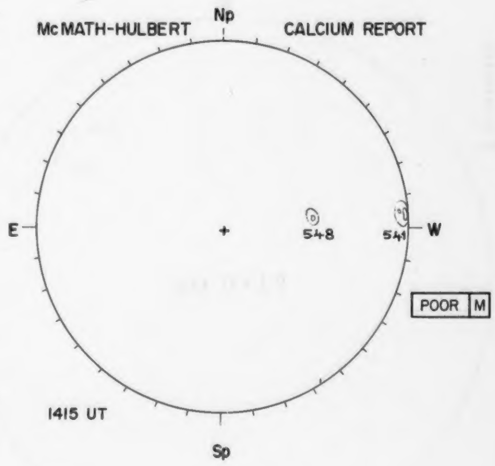


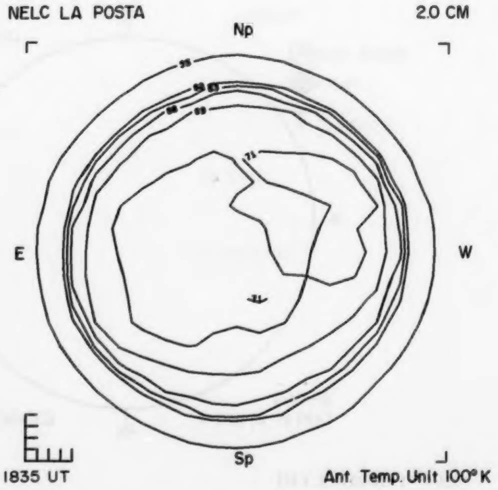


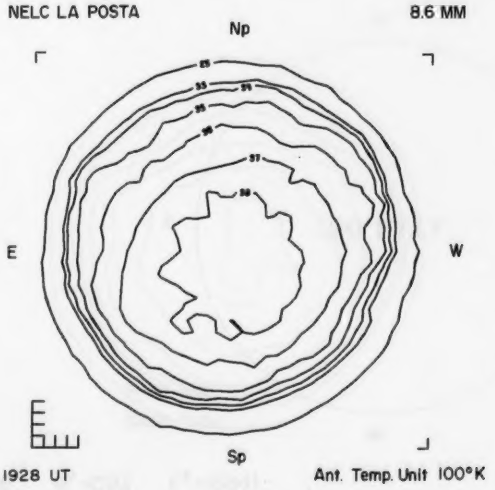
02


RAMEY AFB
Np
Hα
E
W
1208 UT
Sp


BOULDER
Np
SUNSPOTS
E
NO SPOTS VISIBLE
W
1515 UT
CORONA
NORIKURA
Sp


McMATH-HULBERT
Np
CALCIUM REPORT
E
548
541
W
POOR
M
1415 UT
Sp

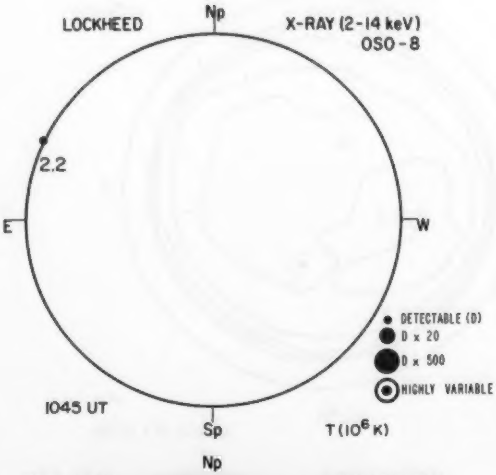

NELC LA POSTA
Np
2.0 CM
E
W
1835 UT
Sp
Ant. Temp. Unit 100°K


NELC LA POSTA
Np
8.6 MM
E
W
1928 UT
Sp
Ant. Temp. Unit 100°K

DECEMBER 3, 1976 (P =15.28, B_0 =0.57, L_0 =19.94)

LOCKHEED

X-RAY (2-14 keV)
OSO-8



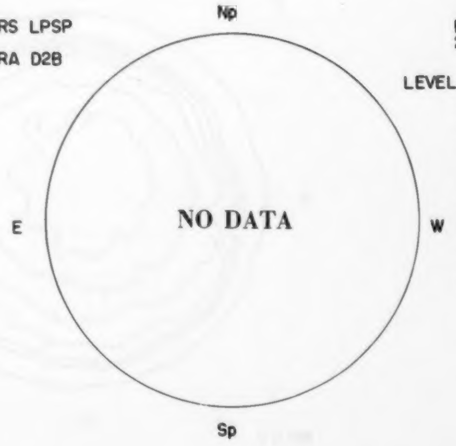
1045 UT

T (10^6 K)

CNRS LPSP
AURA D2B

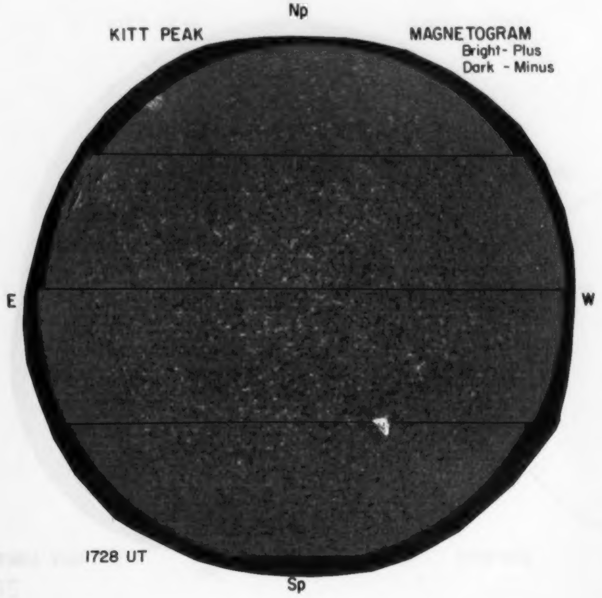
FE XV
284 A

LEVEL 0=20
1=28
2=40
3=56
4=80
5=113
6=160
7=226
8=320
9=452
10=640



KITT PEAK

MAGNETOGRAM
Bright- Plus
Dark - Minus

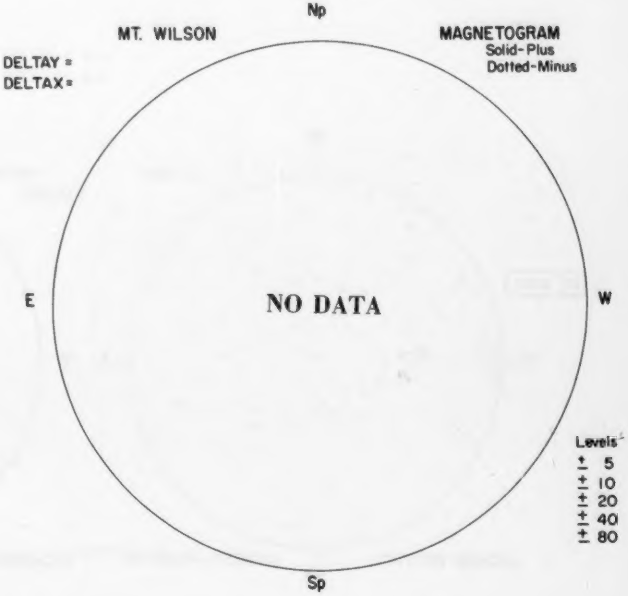


1728 UT

MT. WILSON

MAGNETOGRAM
Solid-Plus
Dotted-Minus

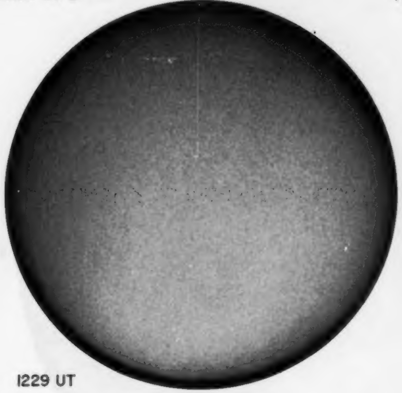
DELTAY =
DELTAX =



Levels
± 5
± 10
± 20
± 40
± 80

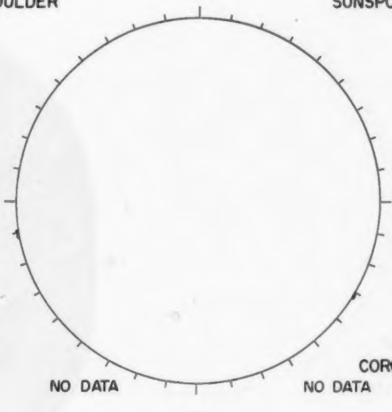
03

RAMEY AFB Np Hα

E  W

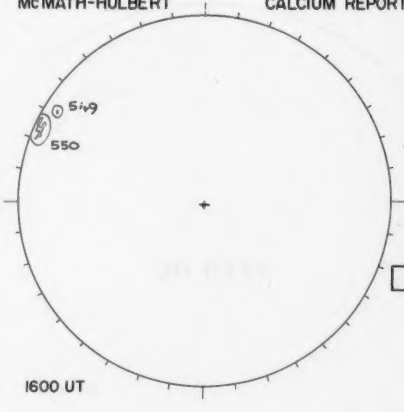
1229 UT Sp

BOULDER Np SUNSPOTS

E  W

Sp

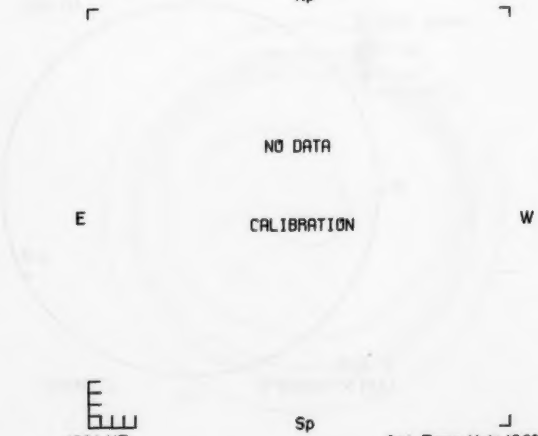
McMATH-HULBERT Np CALCIUM REPORT

E  W

POOR | M

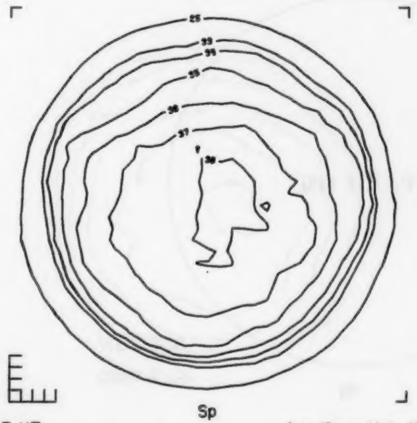
1600 UT Sp

NELC LA POSTA Np 2.0 CM

E  W

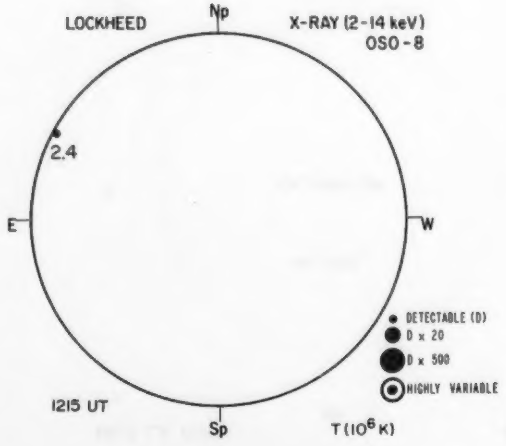
1801 UT Sp Ant. Temp. Unit 100°K

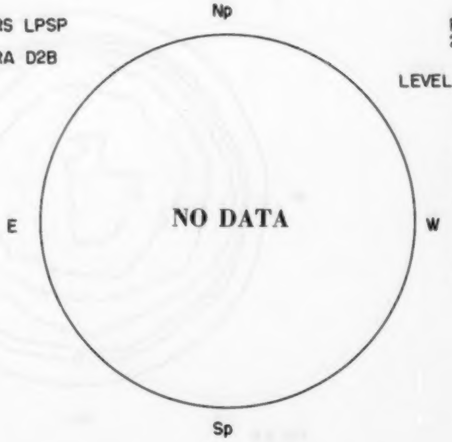
NELC LA POSTA Np 8.6 MM

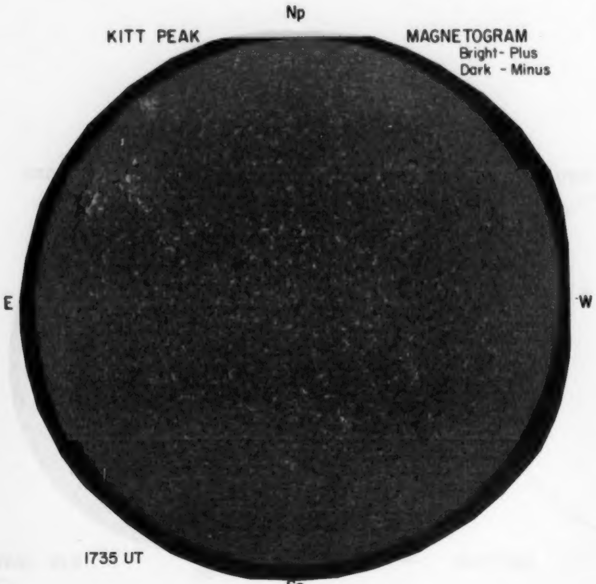
E  W

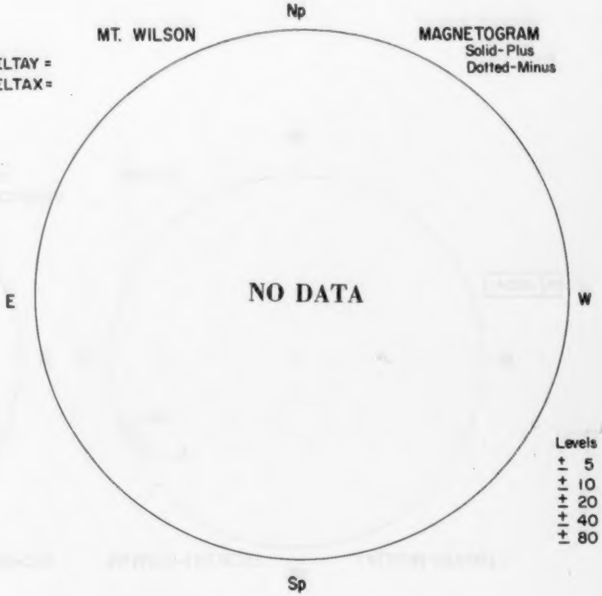
1857 UT Sp Ant. Temp. Unit 100°K

DECEMBER 4, 1976 (P =14.88, B_0 =0.44, L_0 =6.76)



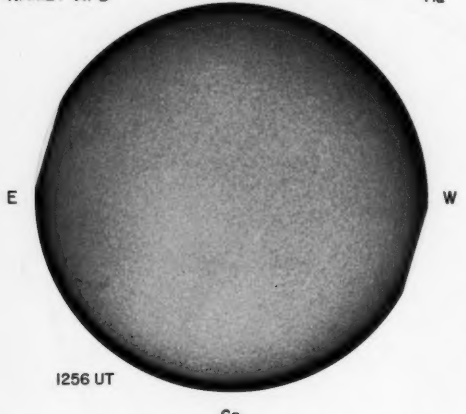






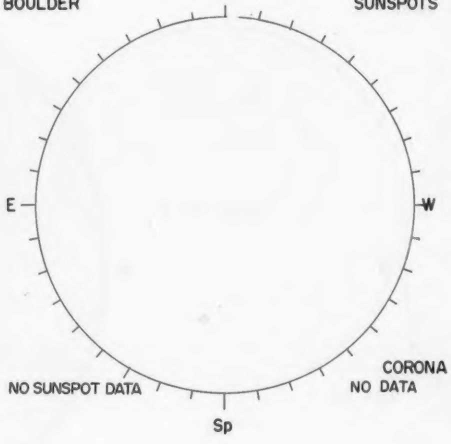
04

RAMEY AFB Hα



1256 UT

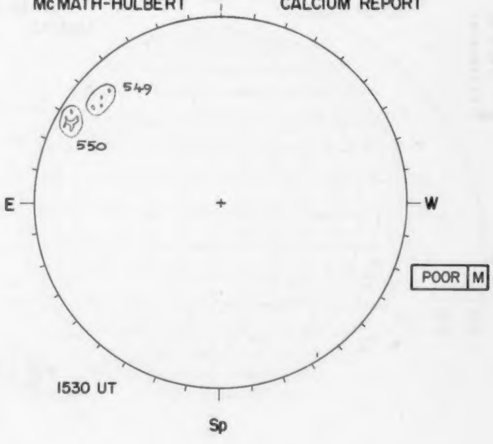
BOULDER SUNSPOTS



NO SUNSPOT DATA

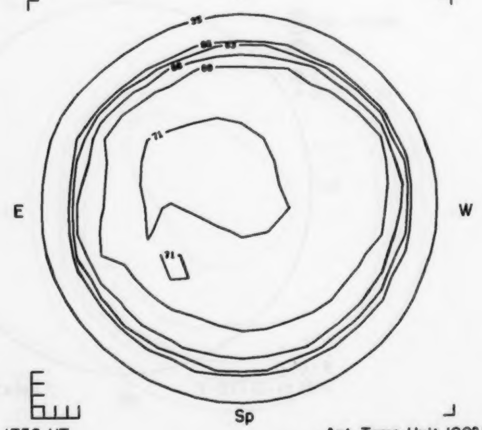
CORONA
NO DATA

McMATH-HULBERT CALCIUM REPORT



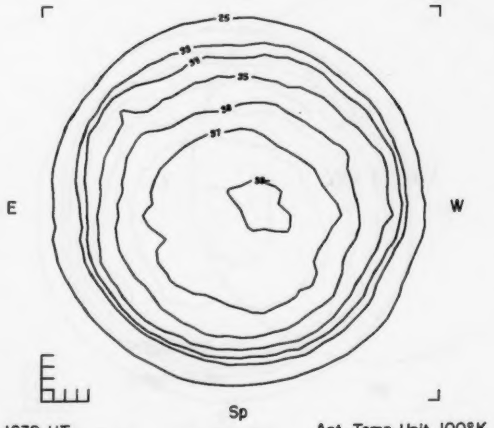
1530 UT

NELC LA POSTA 2.0 CM



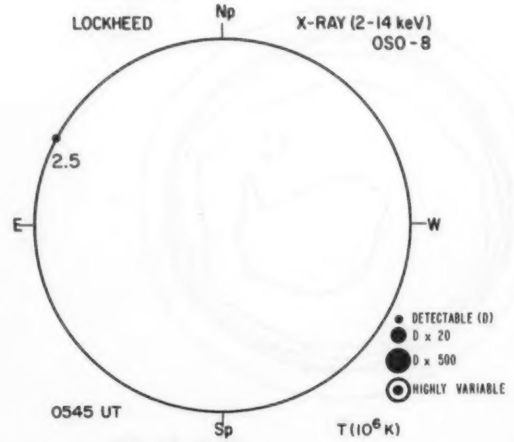
1756 UT Ant. Temp. Unit 100°K

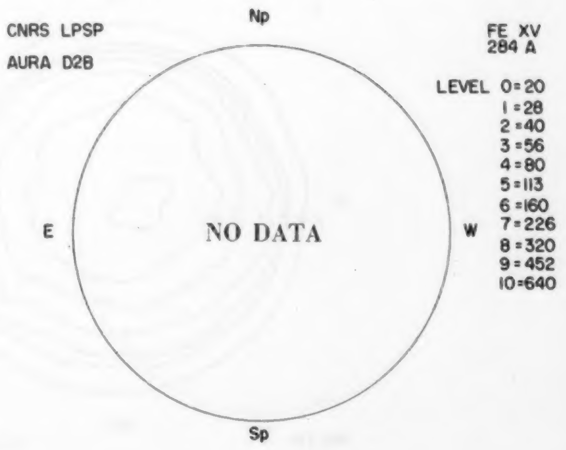
NELC LA POSTA 8.6 MM

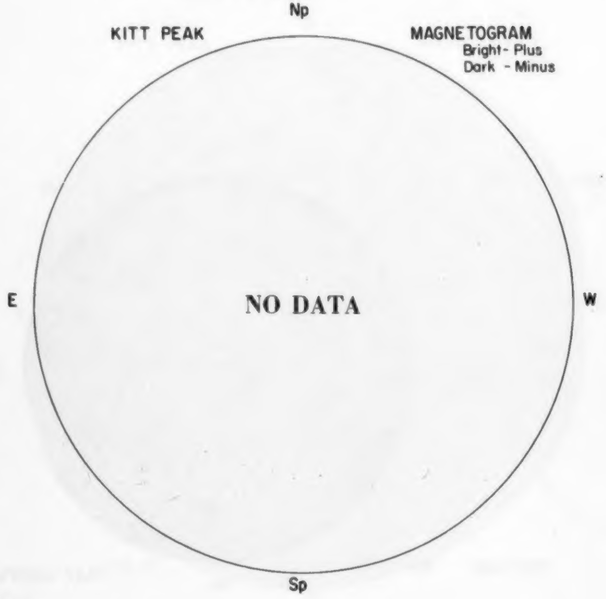


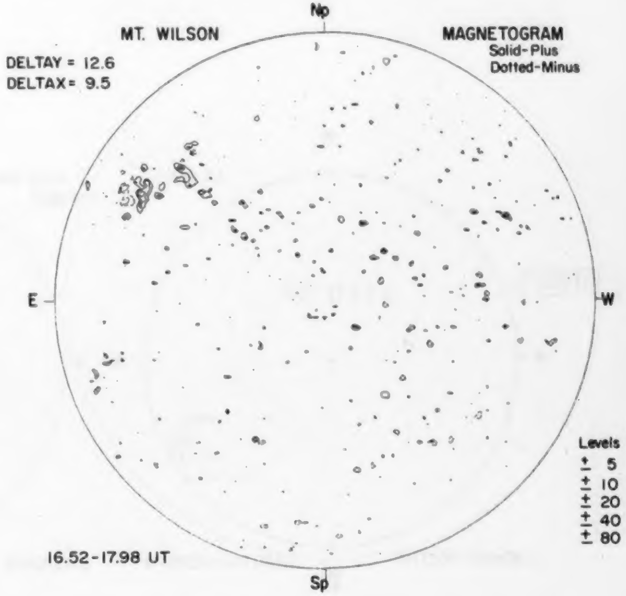
1839 UT Ant. Temp. Unit 100°K

DECEMBER 5, 1976 (P =14.47, B_0 =0.31, L_0 =353.58)





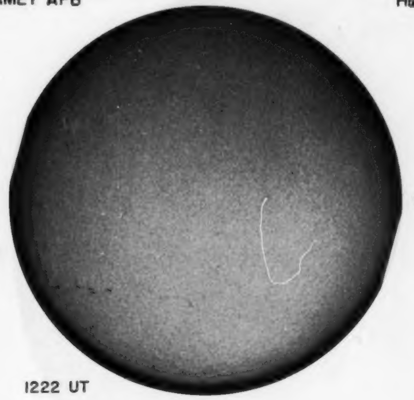




05

RAMEY AFB Hα

Np

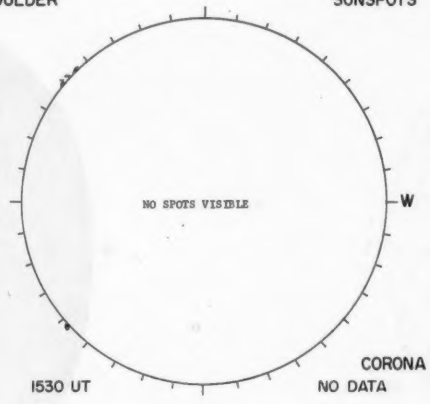
E  W

Sp

1222 UT

BOULDER SUNSPOTS

Np

E  W

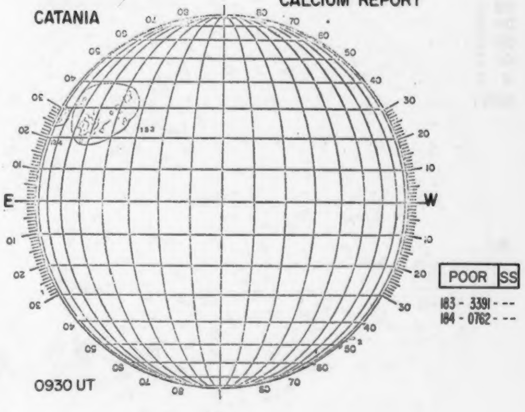
Sp

1530 UT

CORONA
NO DATA

CATANIA CALCIUM REPORT

Np

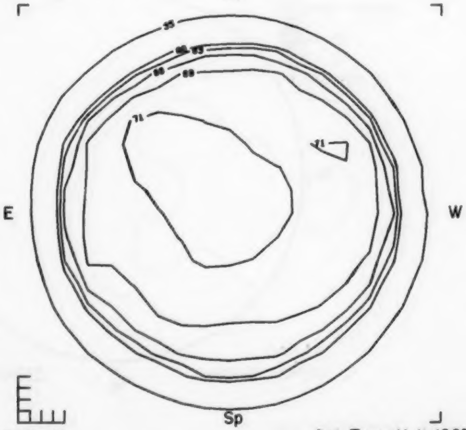
E  W

Sp

0930 UT

NELC LA POSTA 2.0 CM

Np

E  W

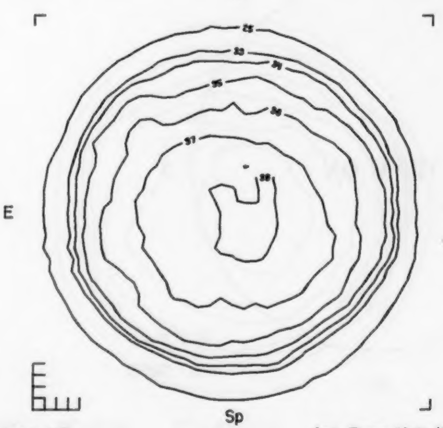
Sp

1730 UT

Ant. Temp. Unit 100°K

NELC LA POSTA 8.6 MM

Np

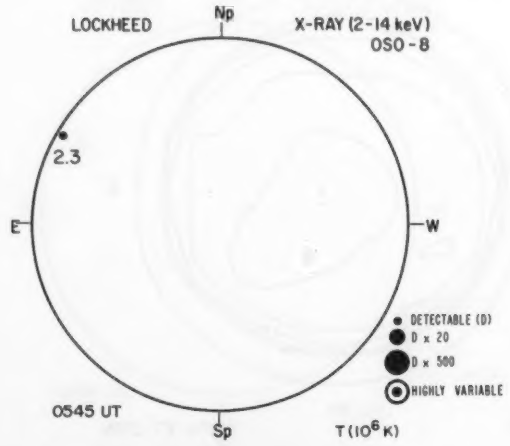
E  W

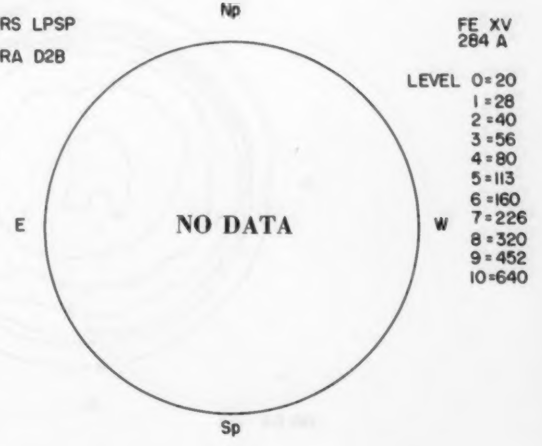
Sp

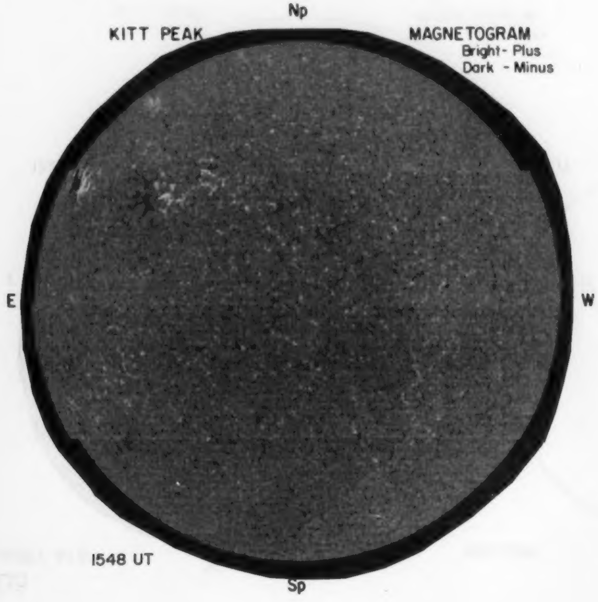
1808 UT

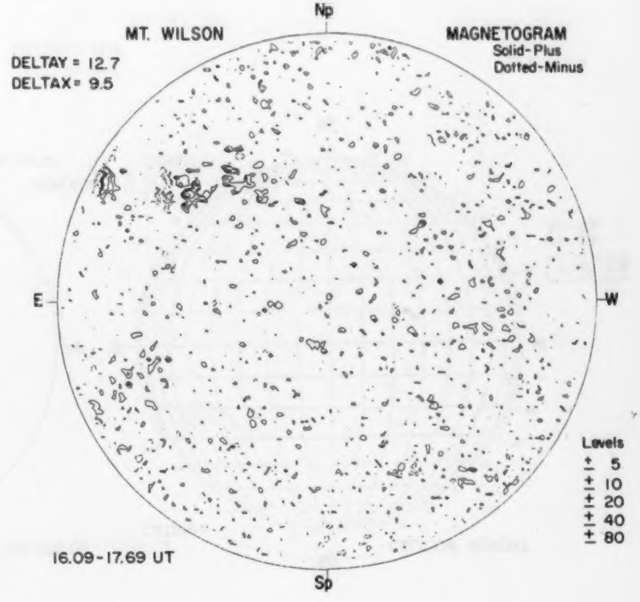
Ant. Temp. Unit 100°K

DECEMBER 6, 1976 (P = 14.06, B_o = 0.18, L_o = 340.41)



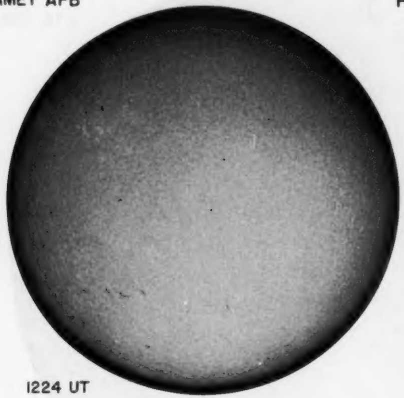






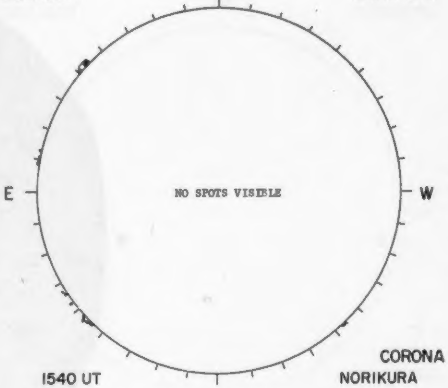
06

RAMEY AFB Hα



1224 UT

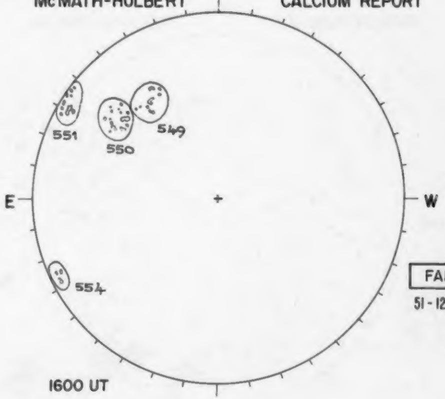
BOULDER SUNSPOTS



1540 UT

CORONA
NORIKURA

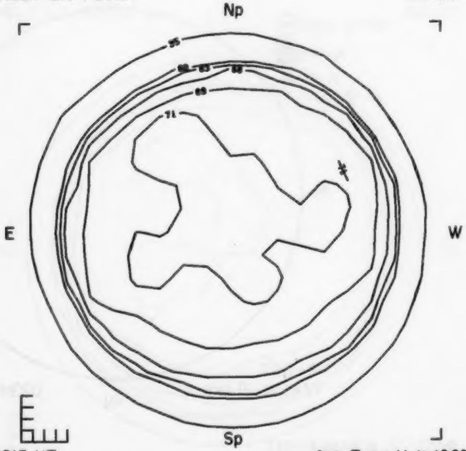
McMATH-HULBERT CALCIUM REPORT



FAIR D
51 - 1200 - 25

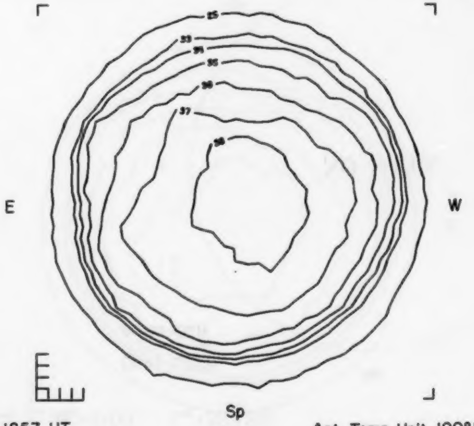
1600 UT

NELC LA POSTA 2.0 CM



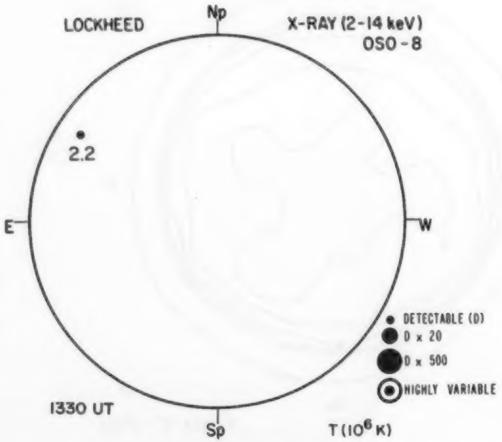
1813 UT
Ant. Temp. Unit 100°K

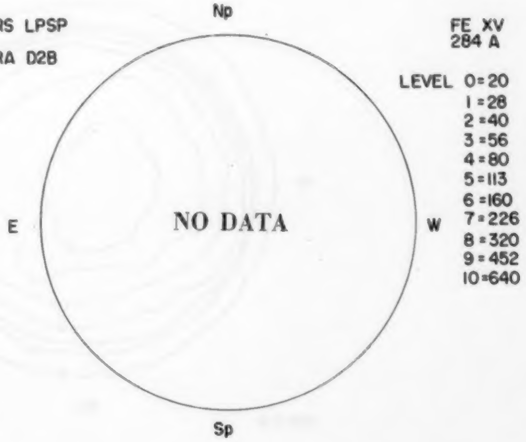
NELC LA POSTA 8.6 MM

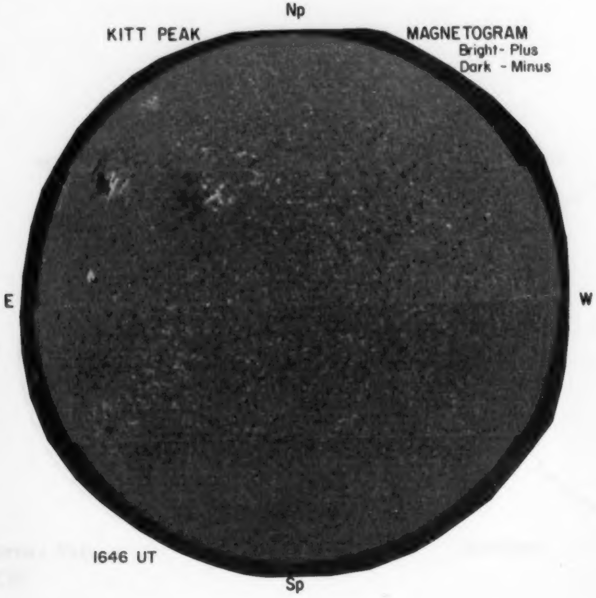


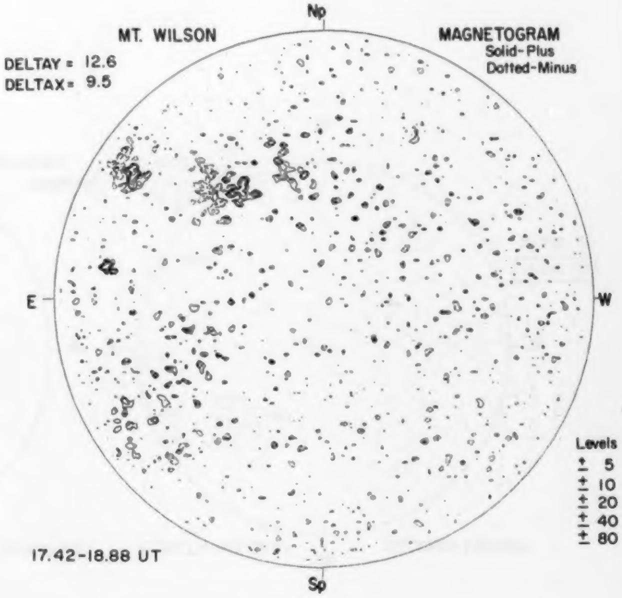
1857 UT
Ant. Temp. Unit 100°K

DECEMBER 7, 1976 (P = 13.65, B_0 = 0.05, L_0 = 327.23)

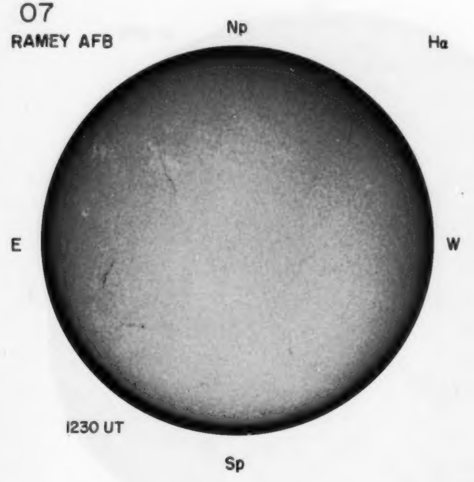


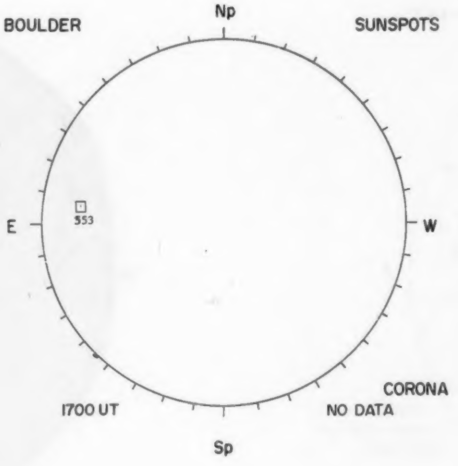


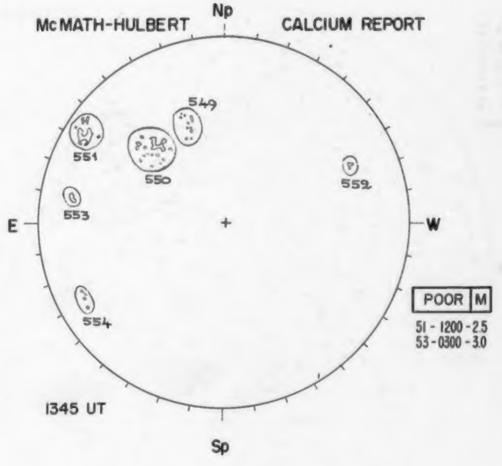


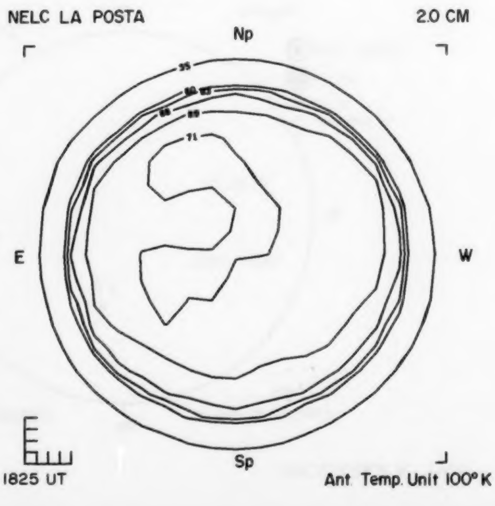


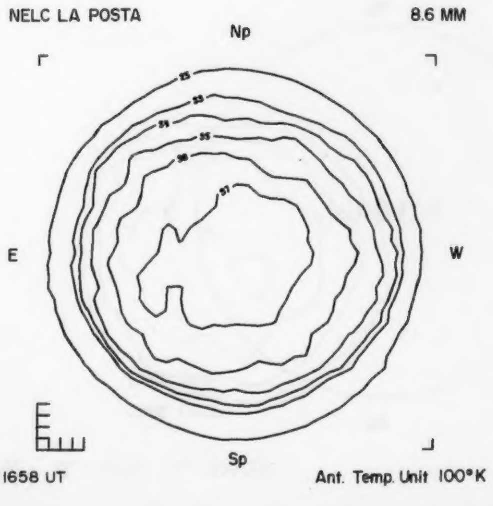
07


RAMEY AFB
Np
Hα
E
W
1230 UT
Sp

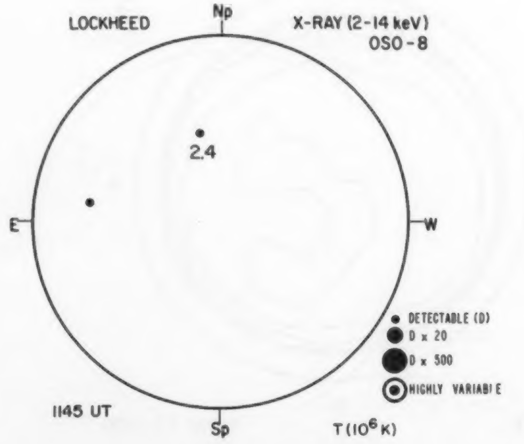

BOULDER
Np
SUNSPOTS
E
553
W
1700 UT
CORONA
NO DATA
Sp

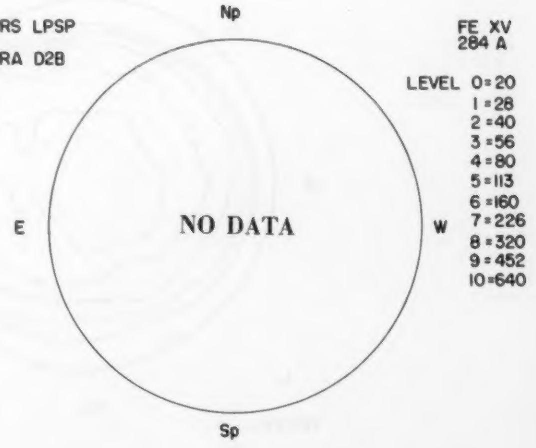

McMATH-HULBERT
Np
CALCIUM REPORT
549
551
550
552
E
553
W
554
POOR M
51 - 1200 - 2.5
53 - 0300 - 3.0
1345 UT
Sp

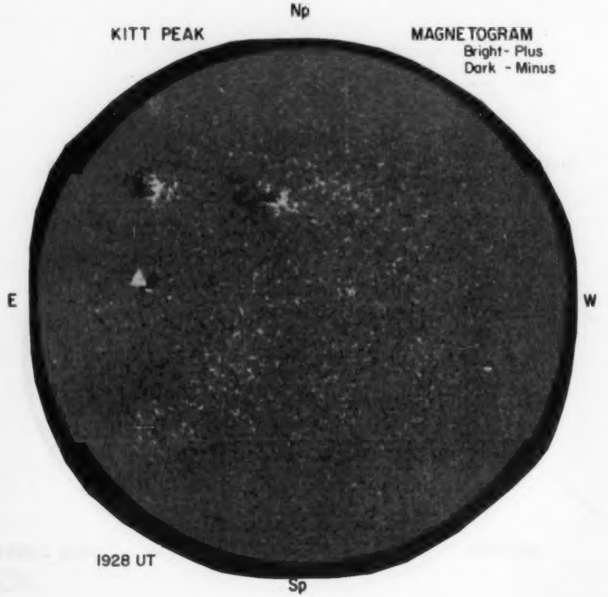

NELC LA POSTA
2.0 CM
Np
E
W
1825 UT
Sp
Ant. Temp. Unit 100°K

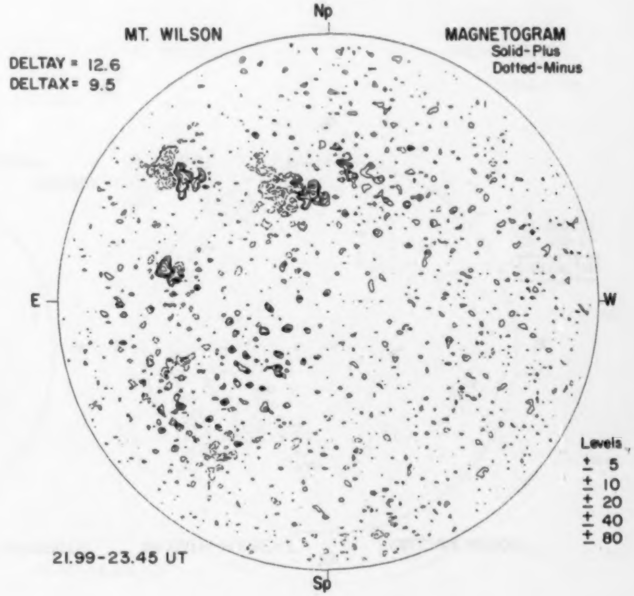

NELC LA POSTA
8.6 MM
Np
E
W
1658 UT
Sp
Ant. Temp. Unit 100°K

DECEMBER 8, 1976 (P =13.23, B_0 =-0.07, L_0 =314.05)



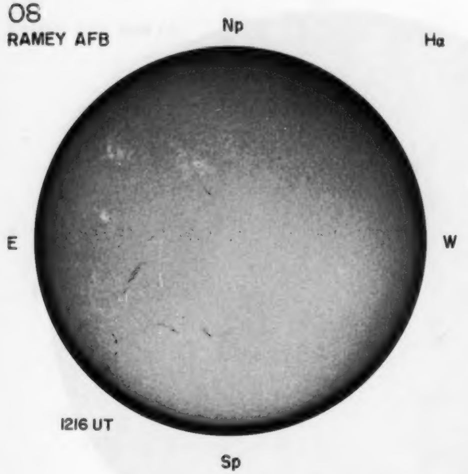




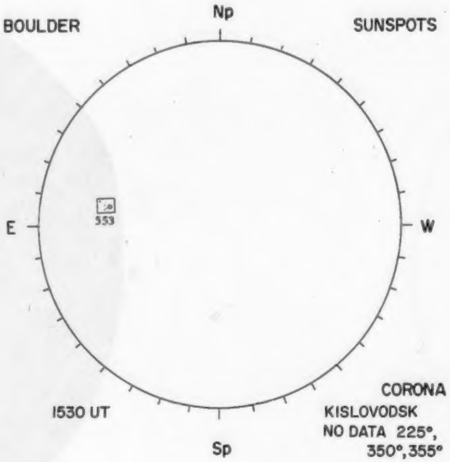


08

RAMEY AFB Hα

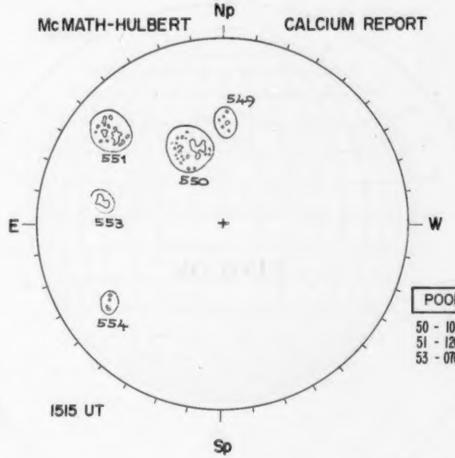


BOULDER SUNSPOTS



CORONA
KISLOVODSK
NO DATA 225°,
350°,355°

McMATH-HULBERT CALCIUM REPORT



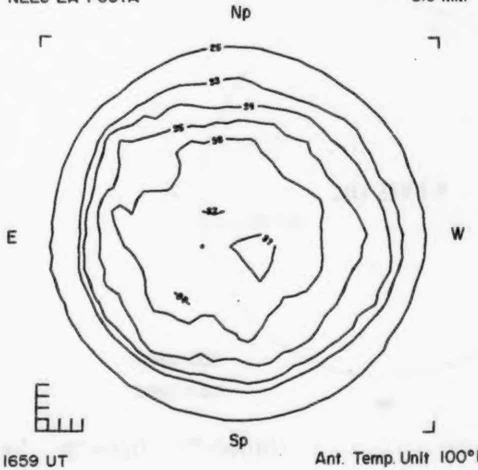
POOR	M

50 - 1000 - 2.5
51 - 1200 - 2.5
53 - 0700 - 3.0

NELC LA POSTA 2.0 CM

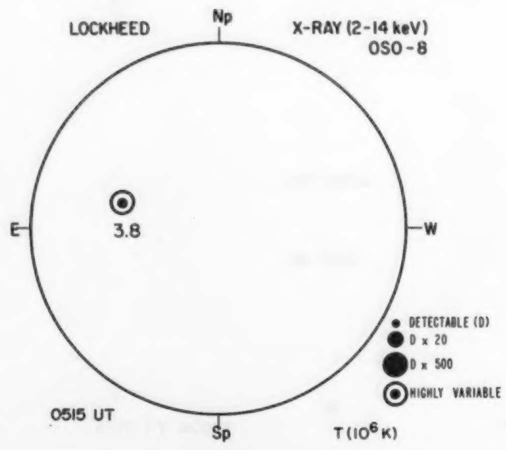
Ant. Temp. Unit 100°K

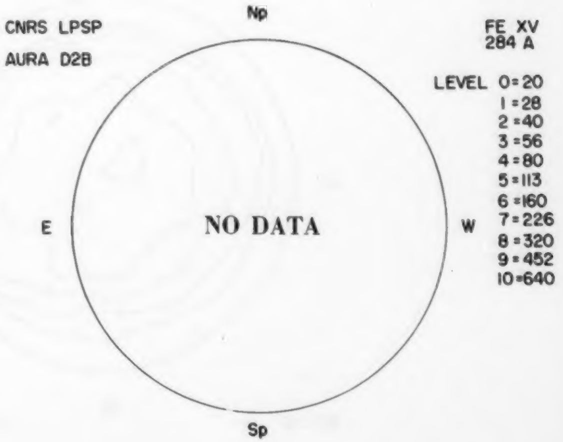
NELC LA POSTA 8.6 MM

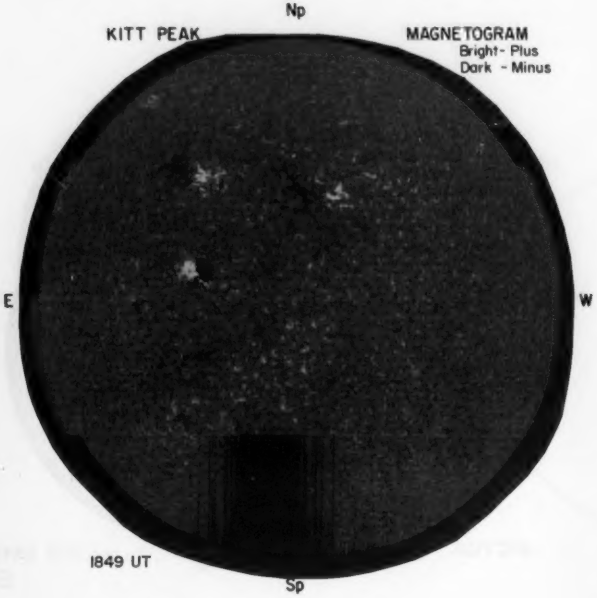


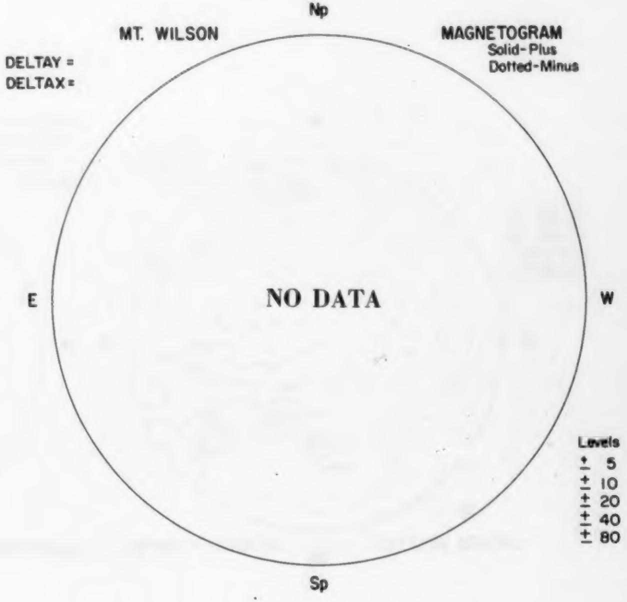
Ant. Temp. Unit 100°K

DECEMBER 9, 1976 (P =12.80, B_0 =-0.20, L_0 =300.87)



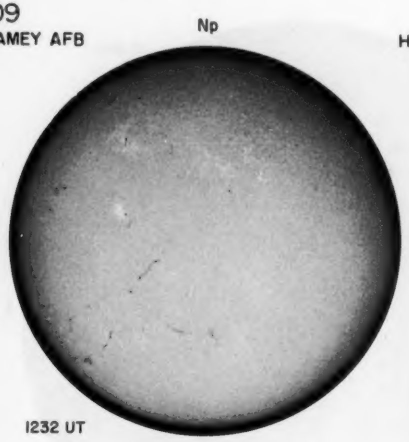




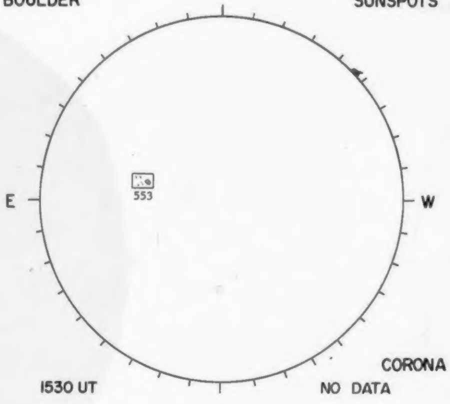


09

RAMEY AFB — Hα



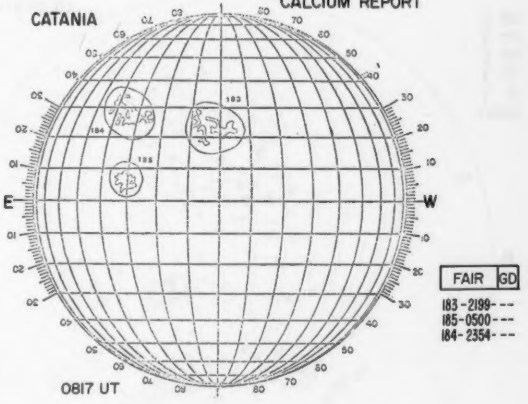
BOULDER — SUNSPOTS



CORONA

NO DATA

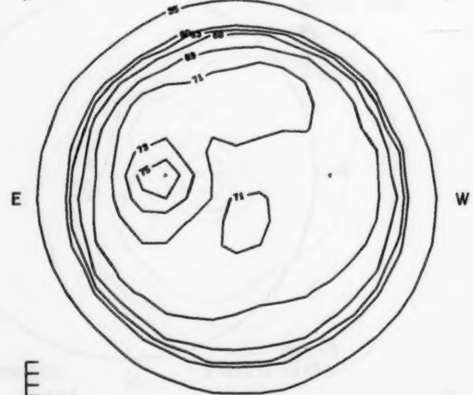
CATANIA — CALCIUM REPORT



FAIR	GD

183-2199---
185-0500---
184-2354---

NELC LA POSTA — 2.0 CM



Ant. Temp. Unit 100°K

NELC LA POSTA — 8.6 MM

Np

NO DATA

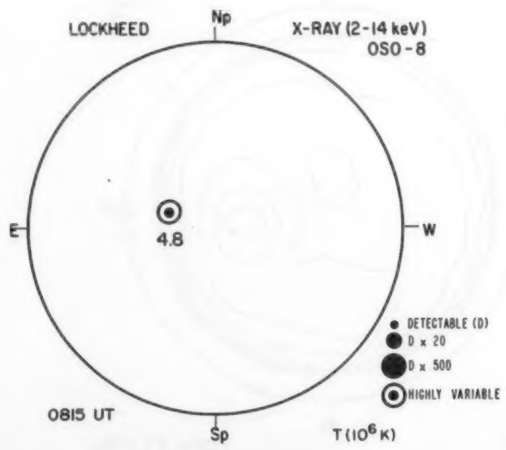
E — CALIBRATION — W

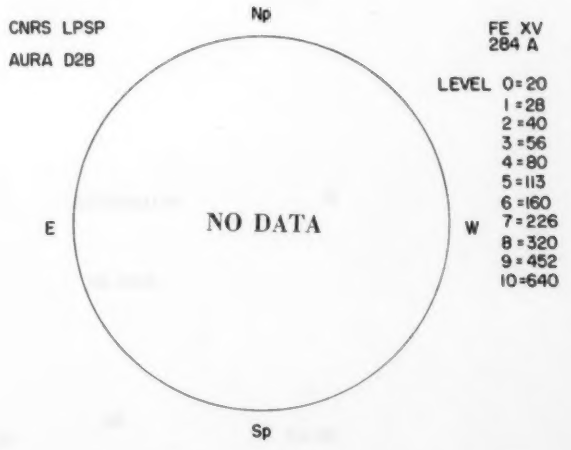
Sp

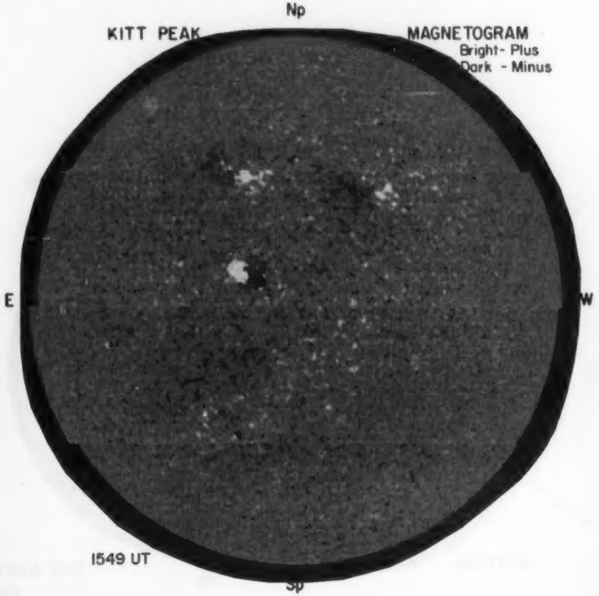
2121 UT

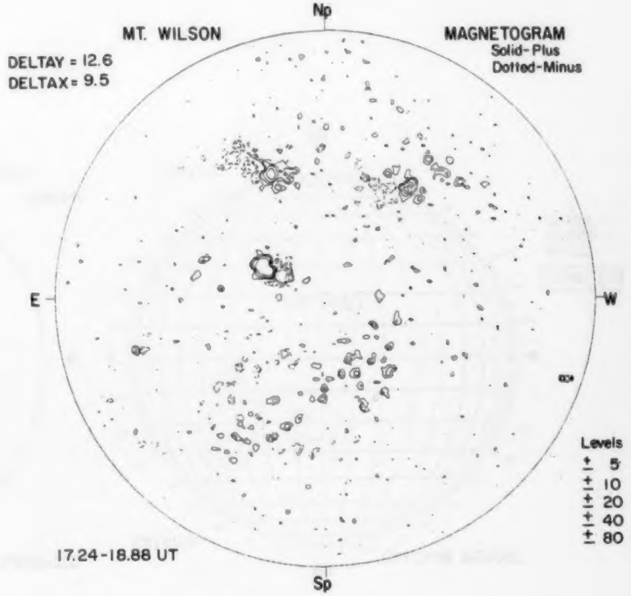
Ant. Temp. Unit 100°K

DECEMBER 10, 1976 (P = 12.37, B_o = -0.33, L_o = 287.70)



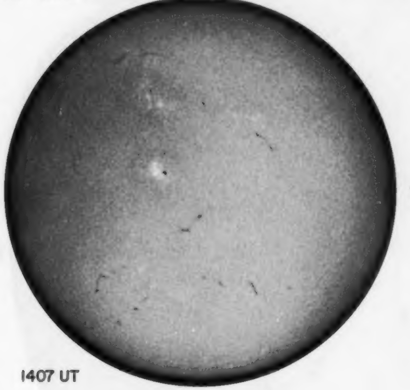






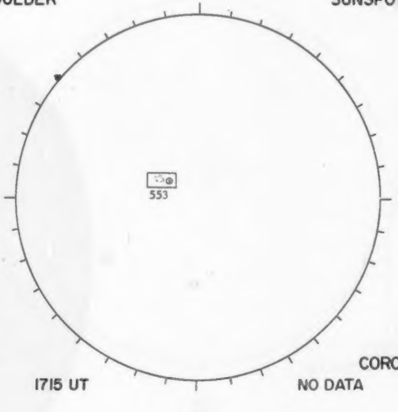
10

RAMEY AFB Hα



1407 UT

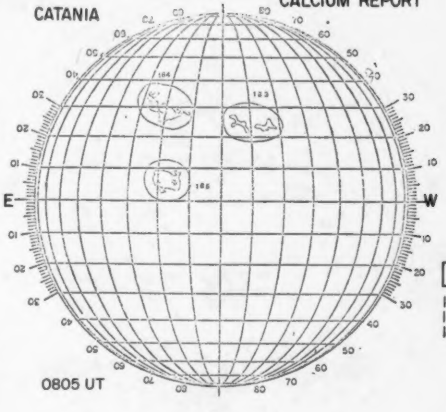
BOULDER SUNSPOTS



1715 UT

CORONA
NO DATA

CATANIA CALCIUM REPORT

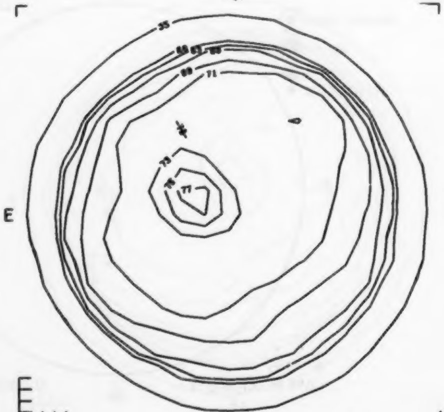


0805 UT

FAIR GD

183 - 0884- - -
185 - 1790- - -
184 - 1541- - -

NELC LA POSTA 2.0 CM



1927 UT Ant. Temp. Unit 100°K

NELC LA POSTA 8.6 MM

Np

E W

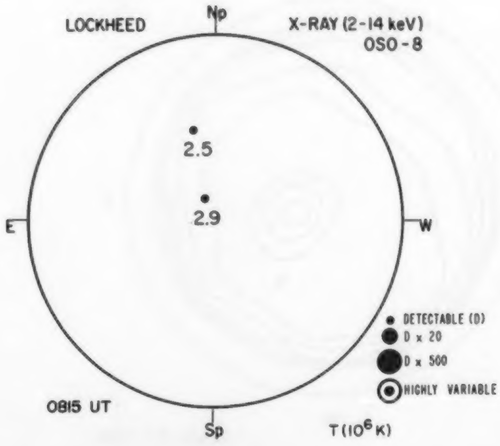
NO DATA

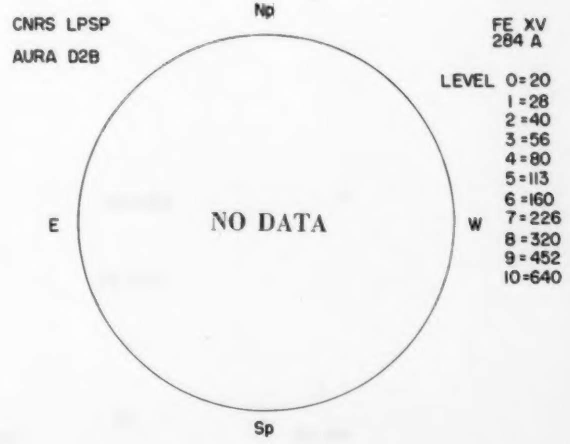
WEATHER

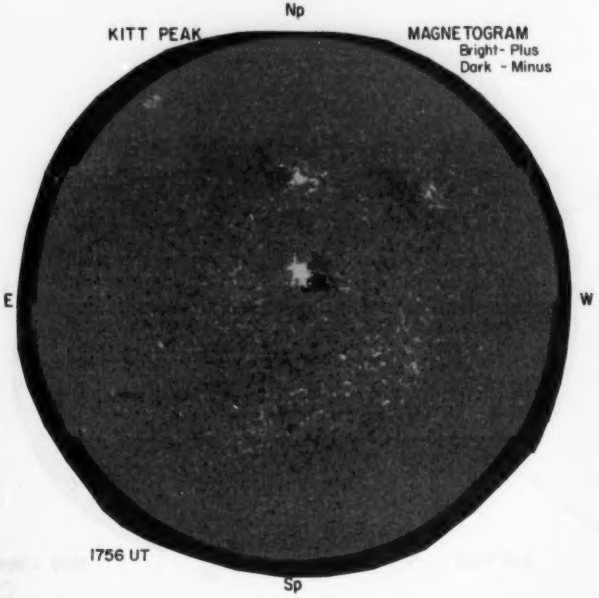
Sp

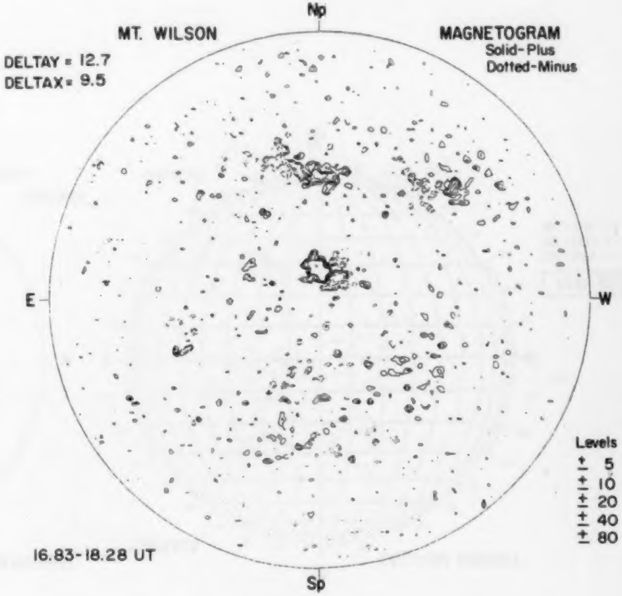
---- UT Ant. Temp. Unit 100°K

DECEMBER 11, 1976 (P = 11.93, B_0 = -0.46, L_0 = 274.52)



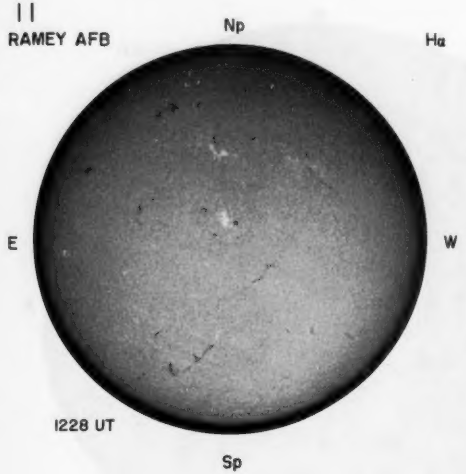




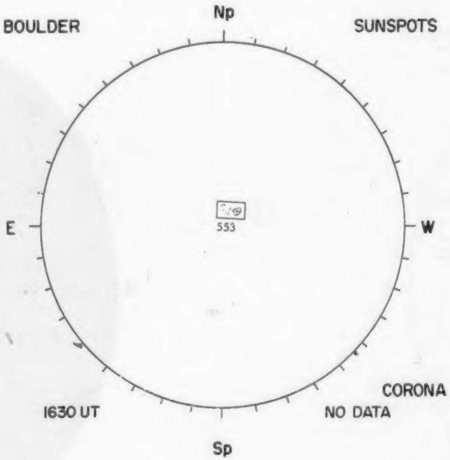


11

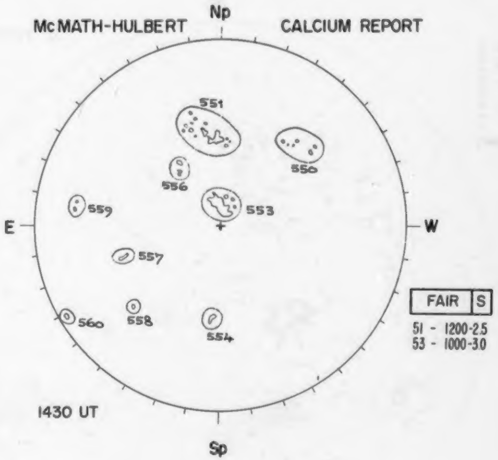
RAMEY AFB — Hα



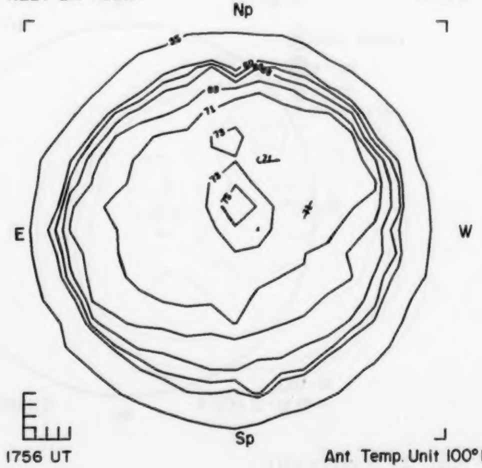
BOULDER — SUNSPOTS



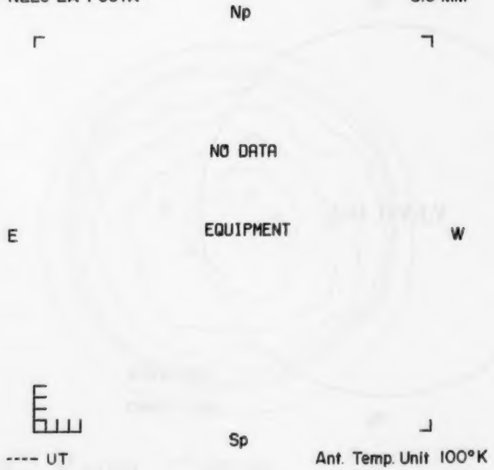
McMATH-HULBERT — CALCIUM REPORT



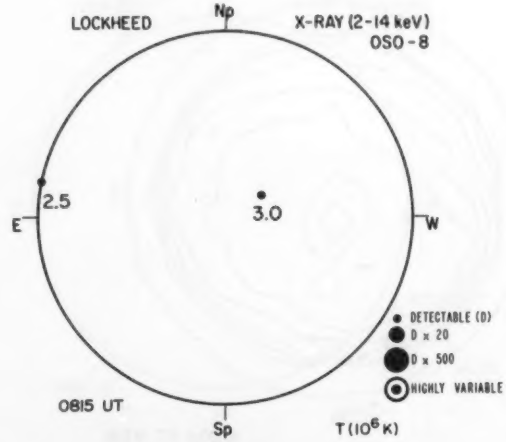
NELC LA POSTA — 2.0 CM

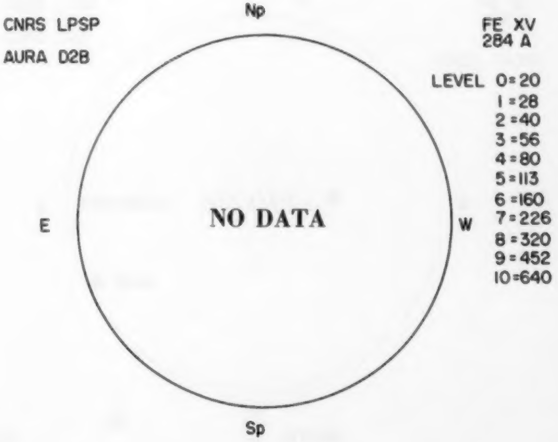


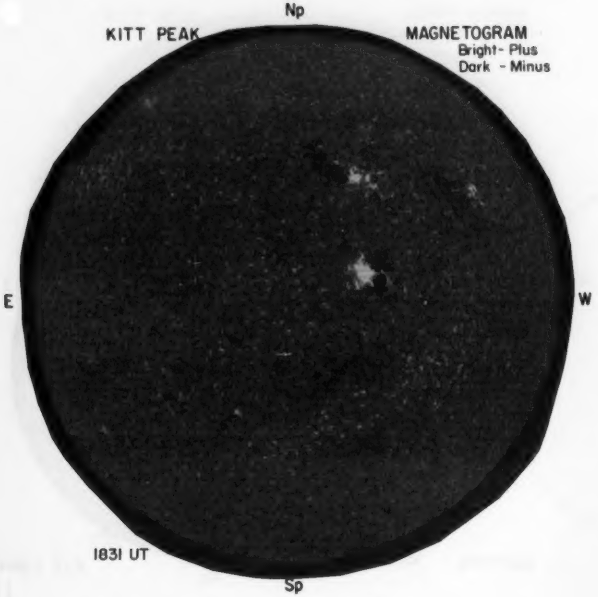
NELC LA POSTA — 8.6 MM

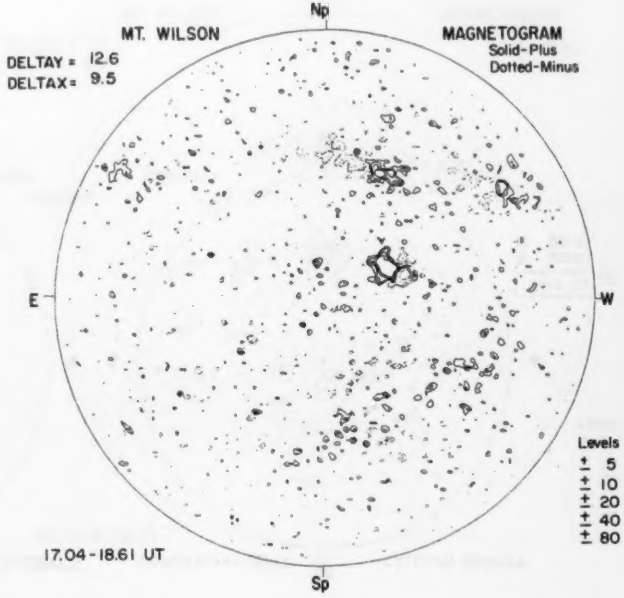


DECEMBER 12, 1976 (P = 11.49, B_0 = -0.59, L_0 = 261.34)



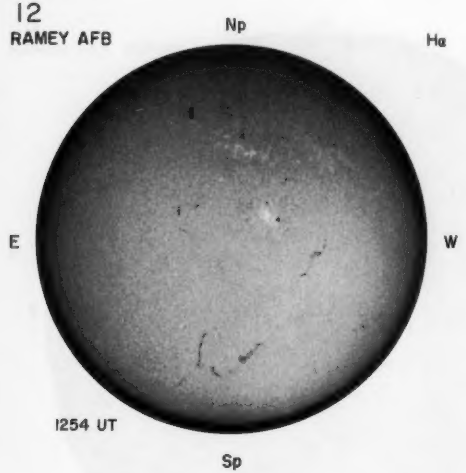




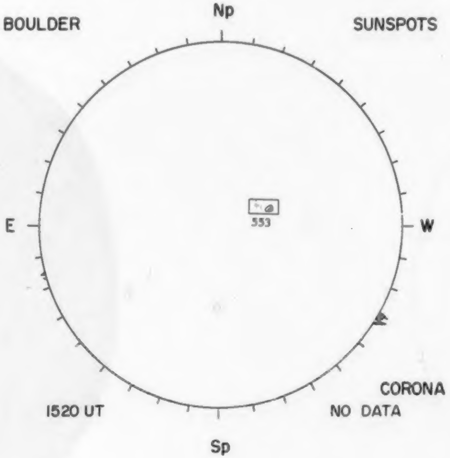


12

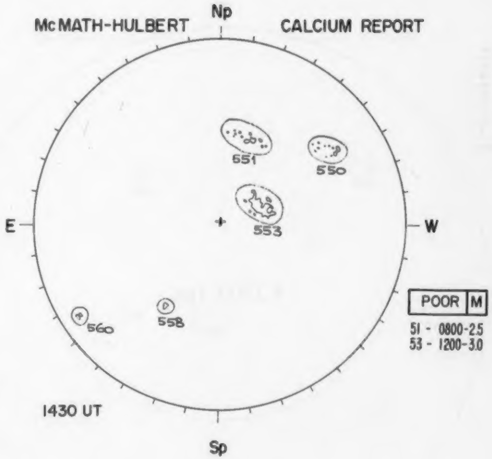
RAMEY AFB Hα



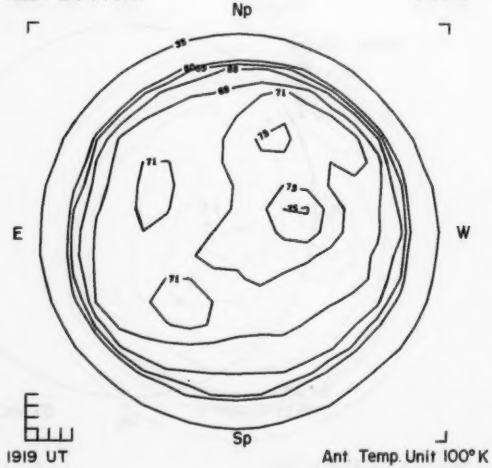
BOULDER SUNSPOTS



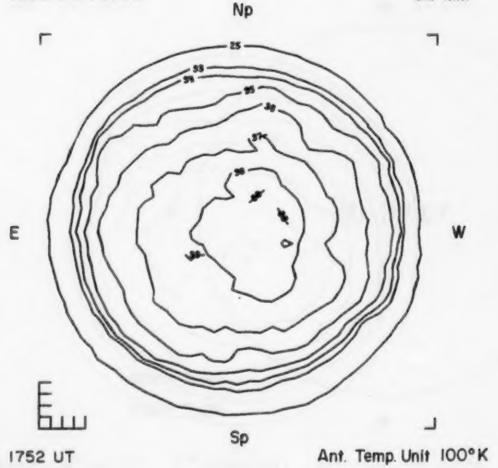
McMATH-HULBERT CALCIUM REPORT



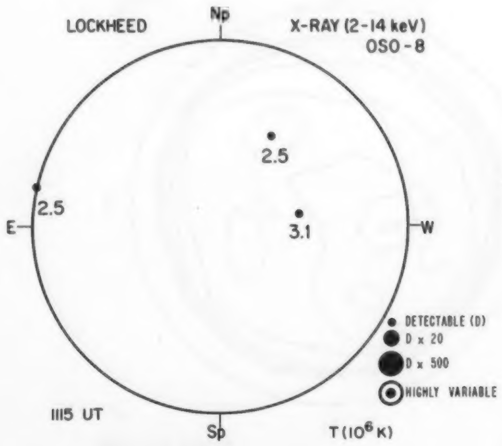
NELC LA POSTA 2.0 CM

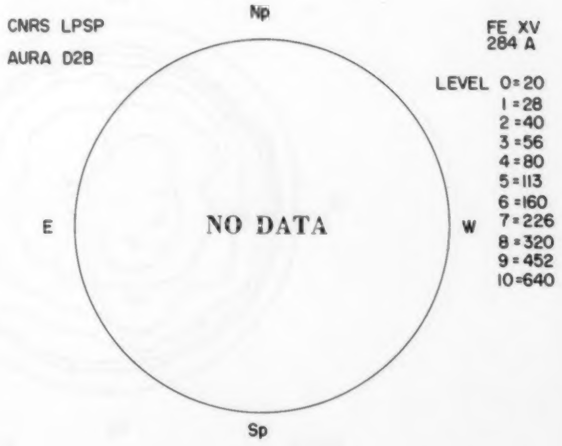


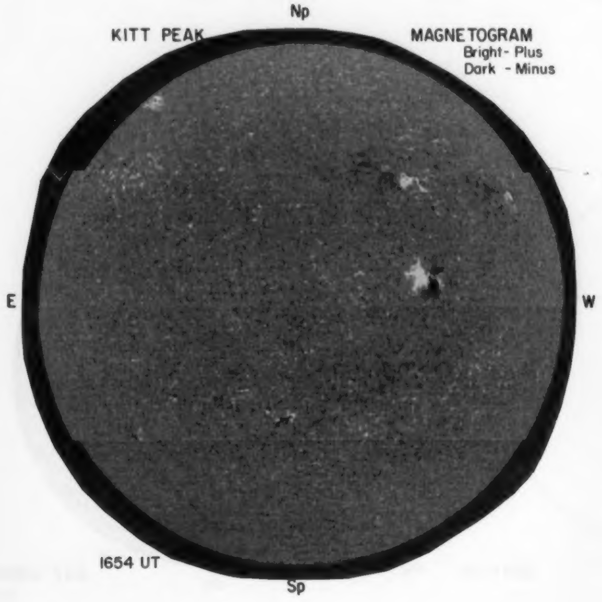
NELC LA POSTA 8.6 MM

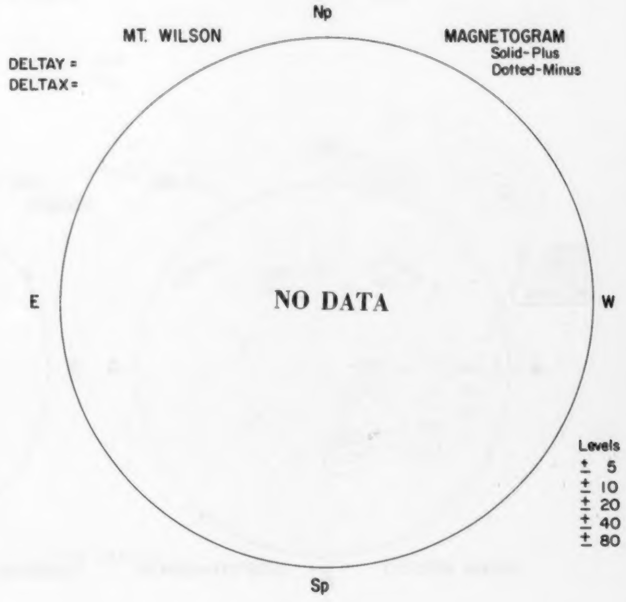


DECEMBER 13, 1976 (P =11.05, B_o =-0.71, L_o =248.17)

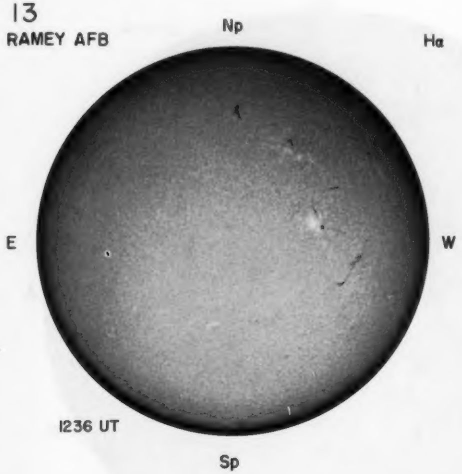


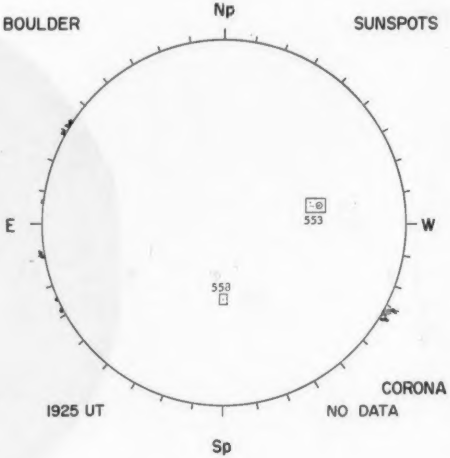


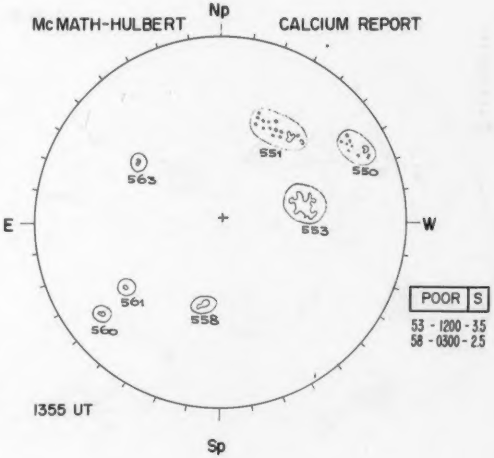


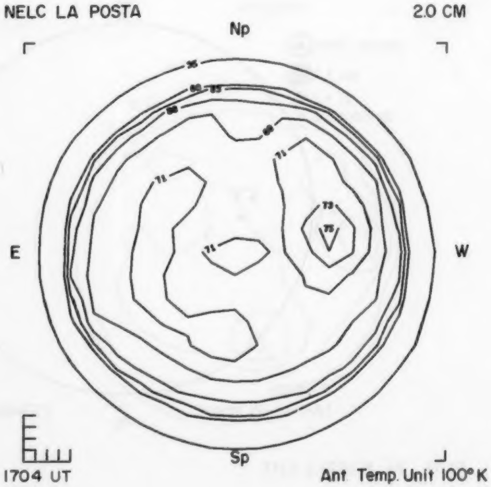


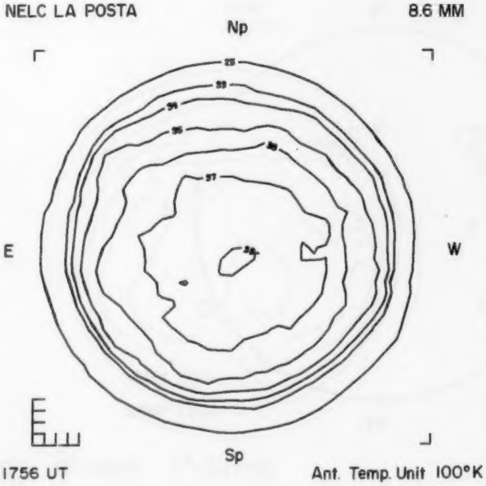
13


RAMEY AFB
Np
Hα
E
W
1236 UT
Sp

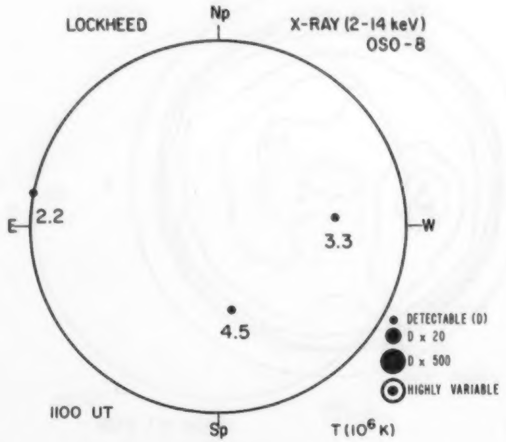

BOULDER
Np
SUNSPOTS
E
W
553
558
CORONA
NO DATA
1925 UT
Sp

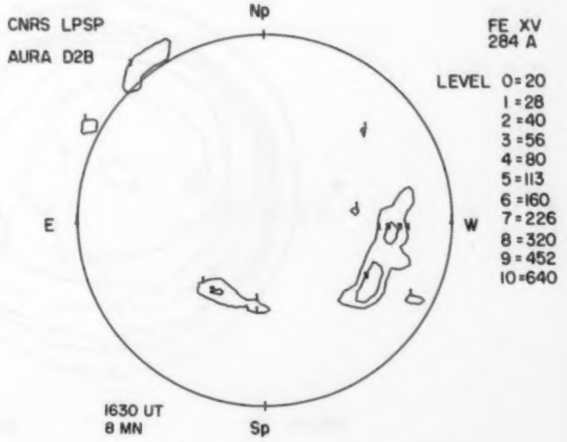

McMATH-HULBERT
Np
CALCIUM REPORT
E
W
551
550
563
553
561
560
558
POOR S
53 - 1200 - 3.5
58 - 0300 - 2.5
1355 UT
Sp

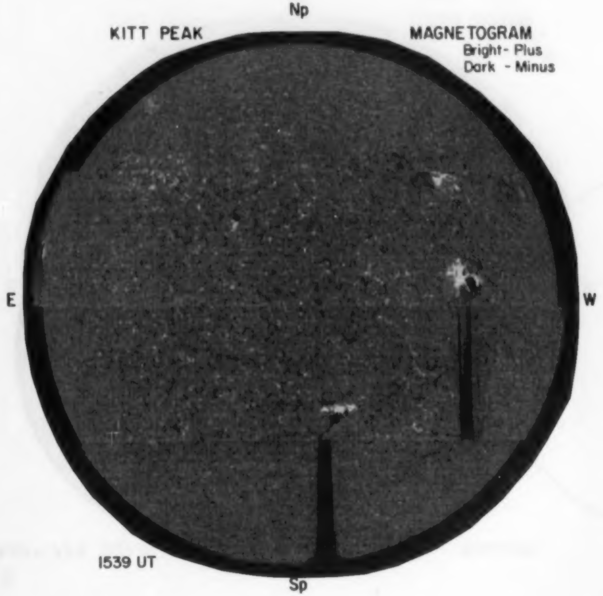

NELC LA POSTA
2.0 CM
Np
E
W
1704 UT
Sp
Ant. Temp. Unit 100°K

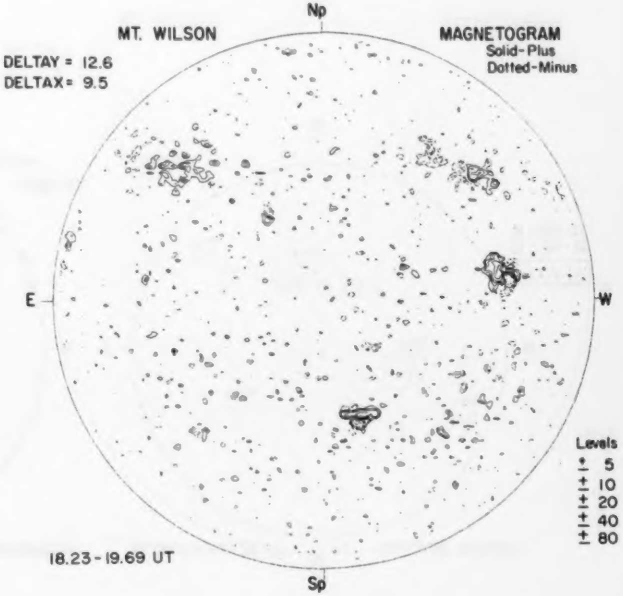

NELC LA POSTA
8.6 MM
Np
E
W
1756 UT
Sp
Ant. Temp. Unit 100°K

DECEMBER 14, 1976 (P =10.60, B_0 =-0.84, L_0 =234.99)

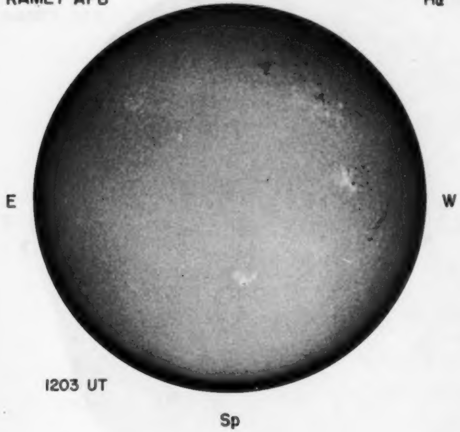


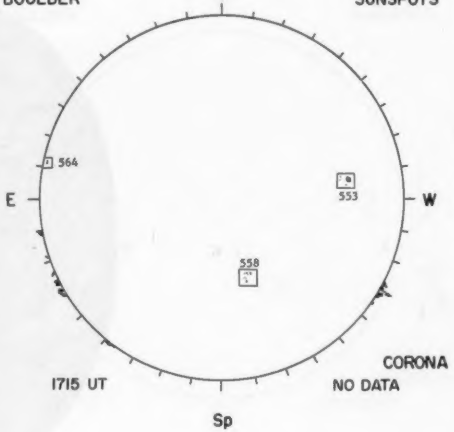


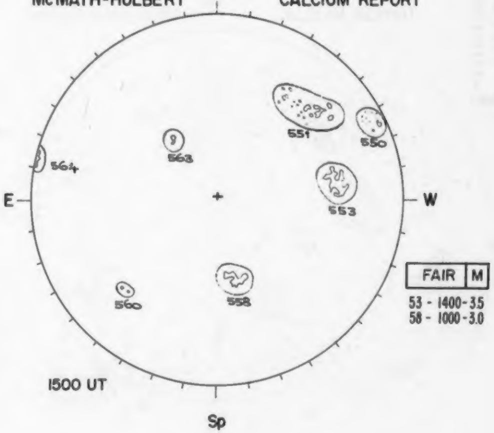


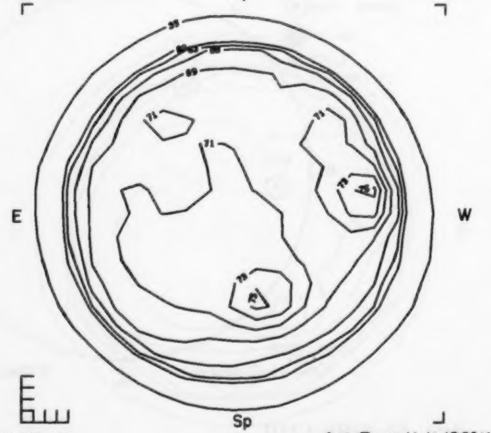


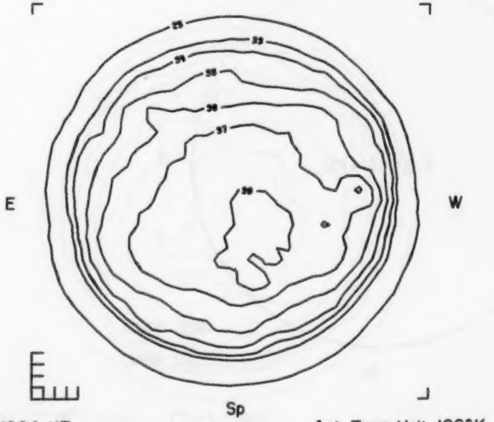
14


RAMEY AFB
Np
Hα
E
W
1203 UT
Sp

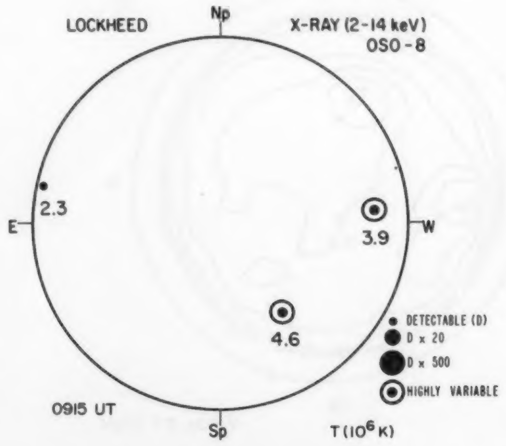

BOULDER
Np
SUNSPOTS
E
W
564
553
558
CORONA
NO DATA
1715 UT
Sp

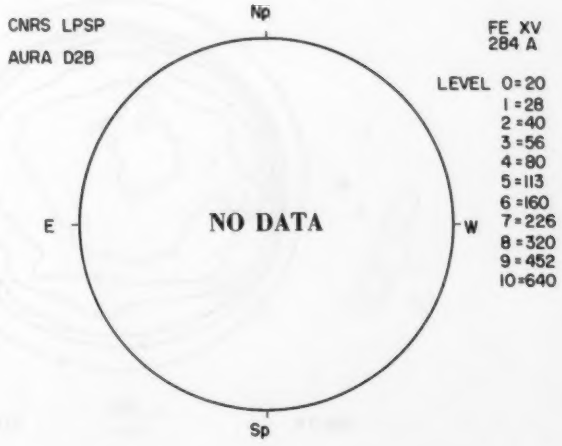

McMATH-HULBERT
Np
CALCIUM REPORT
E
W
564
563
551
550
553
560
558
FAIR M
53 - 1400-3.5
58 - 1000-3.0
1500 UT
Sp

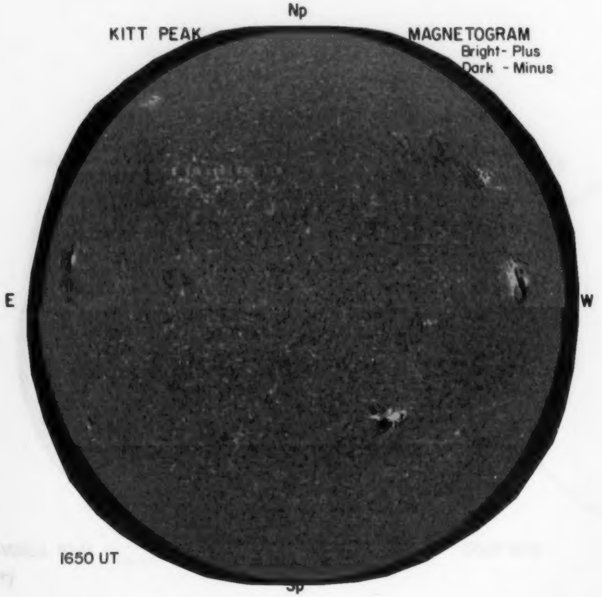

NELC LA POSTA
Np
2.0 CM
E
W
Sp
2037 UT
Ant. Temp. Unit 100°K

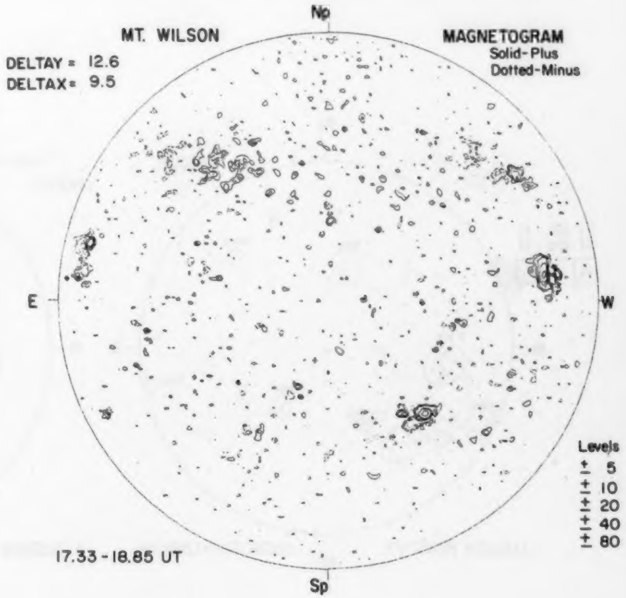

NELC LA POSTA
Np
8.6 MM
E
W
Sp
1904 UT
Ant. Temp. Unit 100°K

DECEMBER 15, 1976 (P =10.15, B_0 =-0.97, L_0 =221.82)



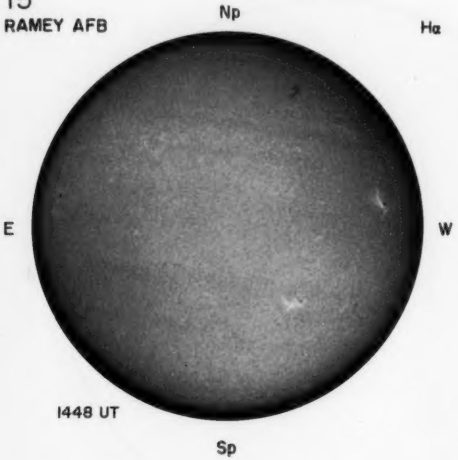






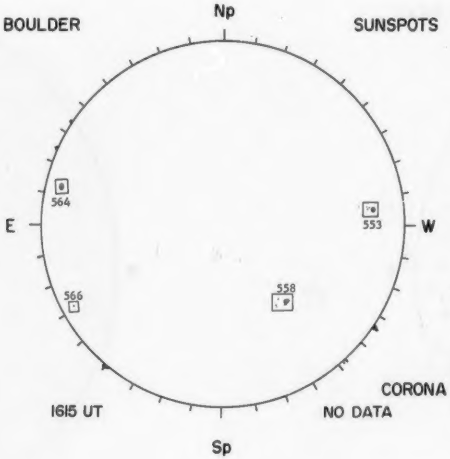
15

RAMEY AFB Hα



1448 UT

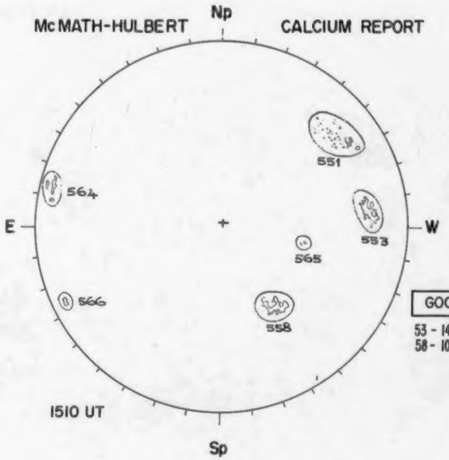
BOULDER SUNSPOTS



1615 UT

CORONA
NO DATA

McMATH-HULBERT CALCIUM REPORT

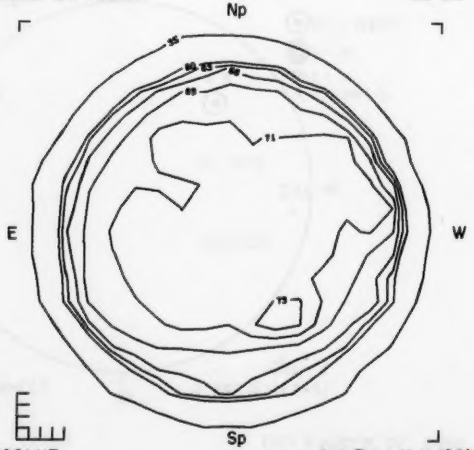


GOOD	M

53 - 1400 - 4.5
58 - 1000 - 3.5

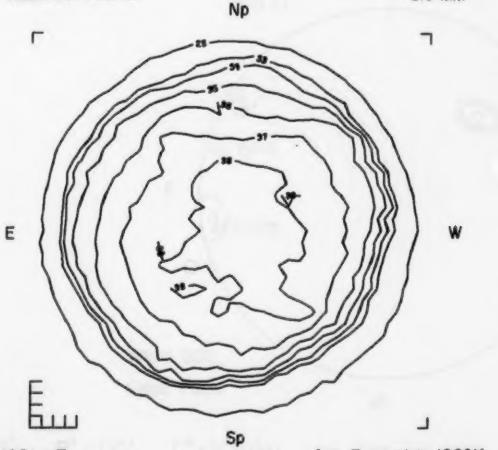
1510 UT

NELC LA POSTA 2.0 CM



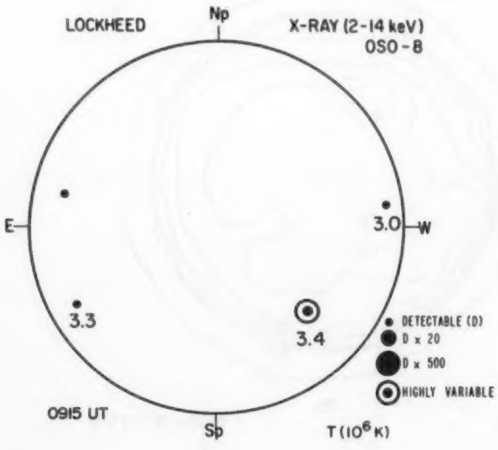
1901 UT Ant. Temp. Unit 100°K

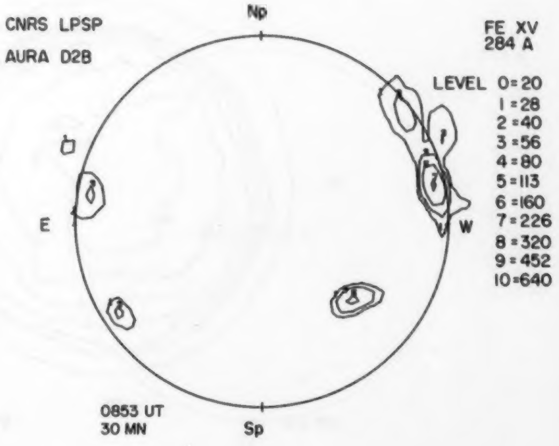
NELC LA POSTA 8.6 MM

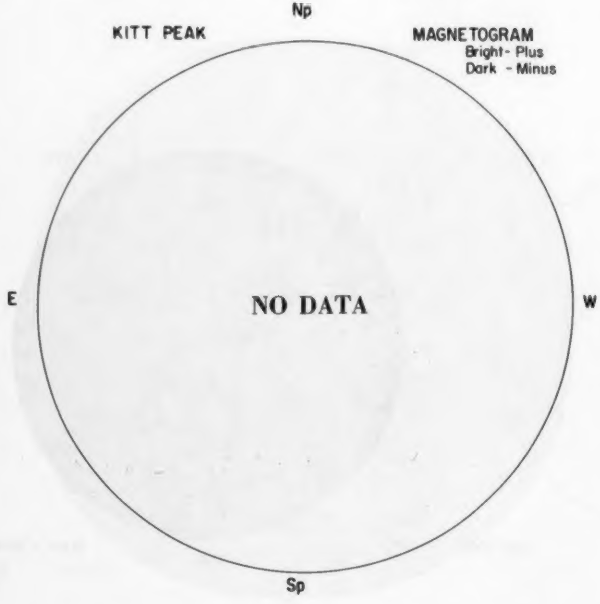


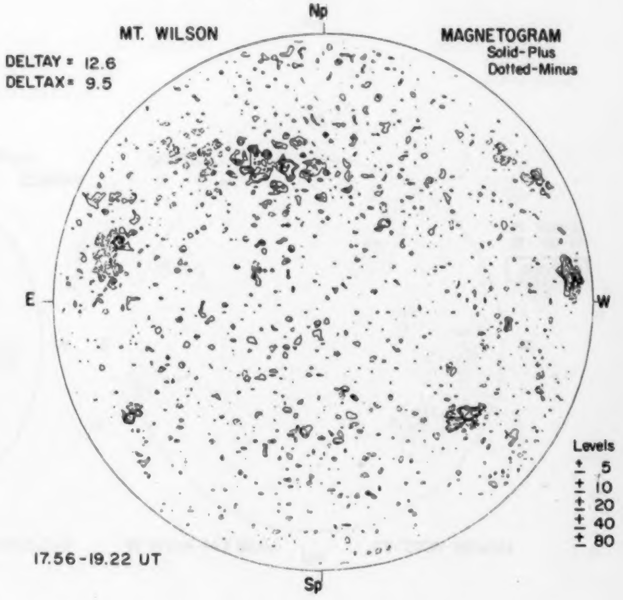
1951 UT Ant. Temp. Unit 100°K

DECEMBER 16, 1976 (P = 9.69, B_o = -1.10, L_o = 208.64)

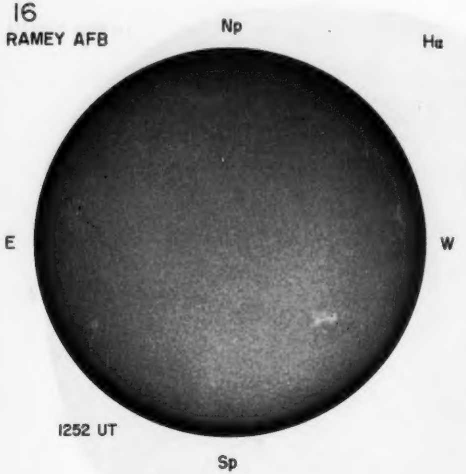


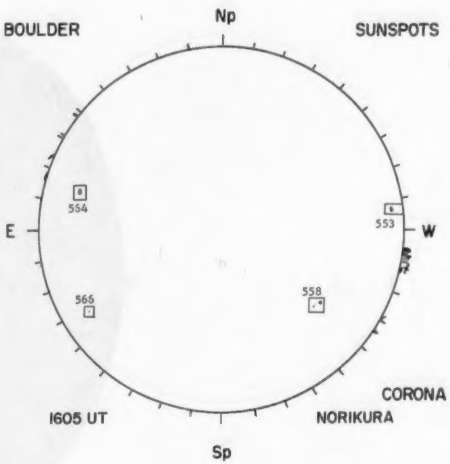


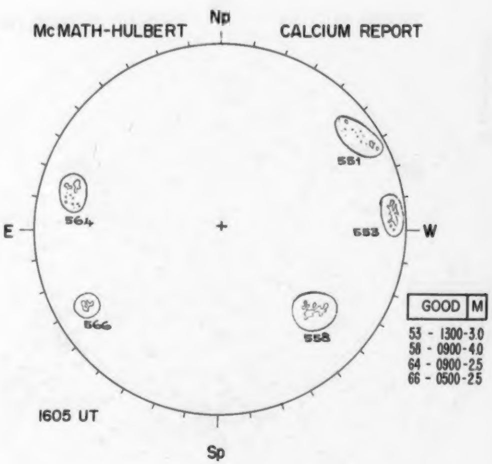


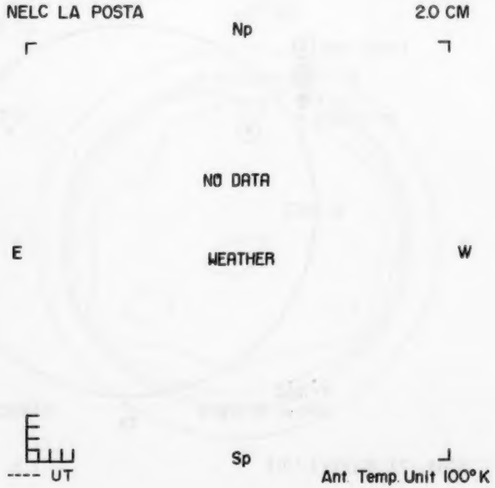


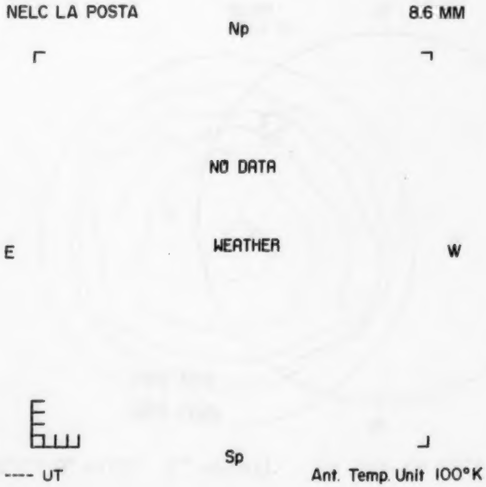
16


RAMEY AFB
Np
Hα
E
W
1252 UT
Sp

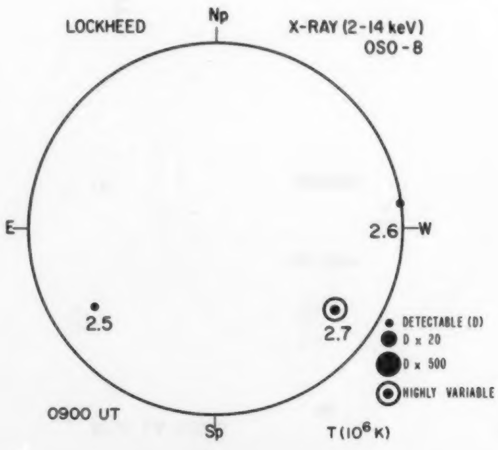

BOULDER
Np
SUNSPOTS
E
W
554
566
553
558
CORONA
1605 UT
NORIKURA
Sp

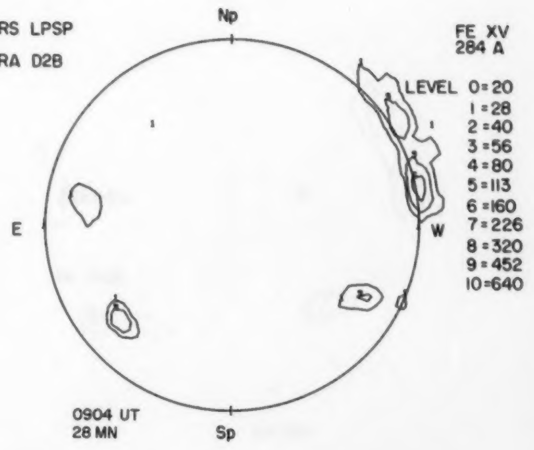

McMATH-HULBERT
Np
CALCIUM REPORT
E
W
564
566
551
553
558
GOOD M
53 - 1300-3.0
58 - 0900-4.0
64 - 0900-2.5
66 - 0500-2.5
1605 UT
Sp

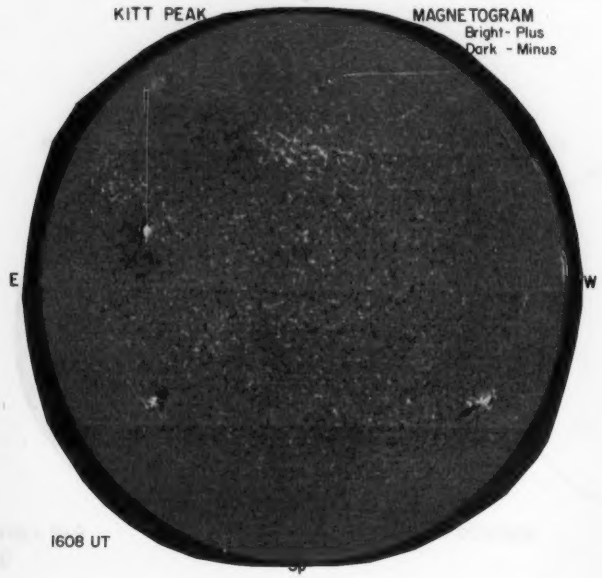

NELC LA POSTA
Np
2.0 CM
NO DATA
E
WEATHER
W
---- UT
Sp
Ant. Temp. Unit 100°K

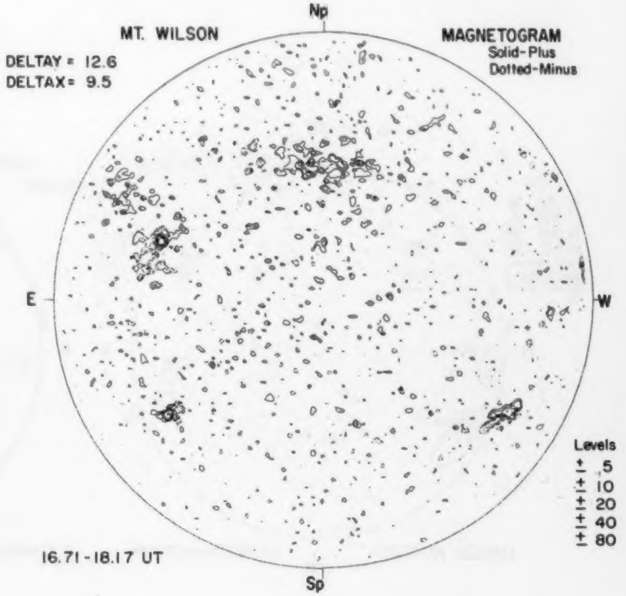

NELC LA POSTA
Np
8.6 MM
NO DATA
E
WEATHER
W
---- UT
Sp
Ant. Temp. Unit 100°K

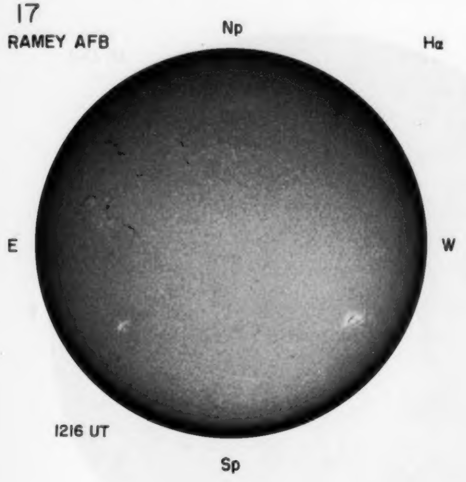
DECEMBER 17, 1976 (P = 9.23, B_0 = -1.22, L_0 = 195.47)

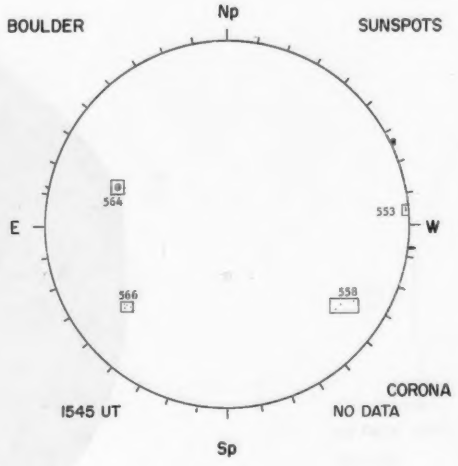


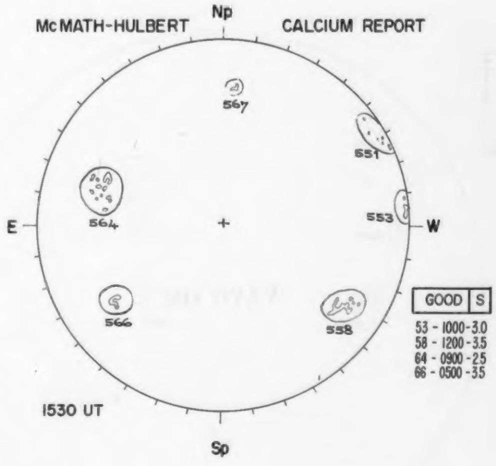


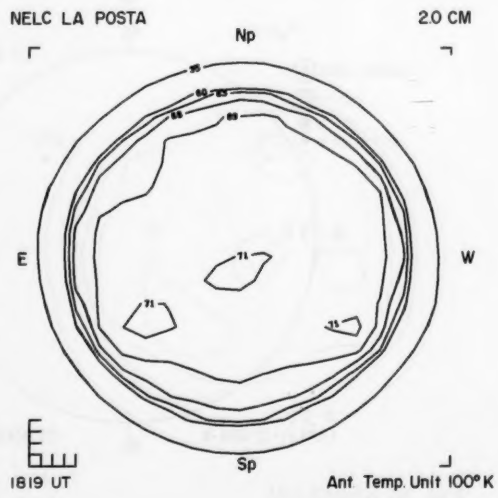


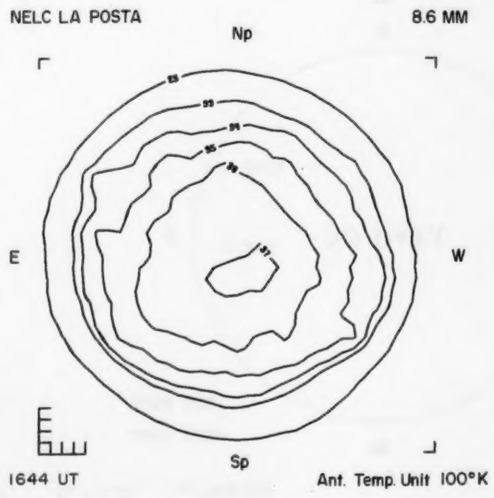



17
RAMEY AFB
Np
Hα
E
W
1216 UT
Sp

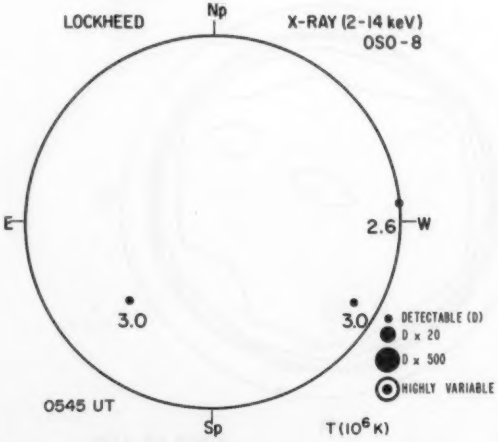

BOULDER
Np
SUNSPOTS
564
553
E
W
566
558
CORONA
1545 UT
NO DATA
Sp

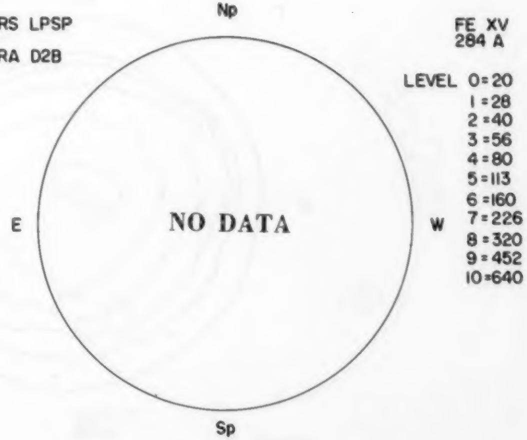

McMATH-HULBERT
Np
CALCIUM REPORT
567
551
564
553
E
W
566
558
GOOD S
53 - 1000-3.0
58 - 1200-3.5
64 - 0900-2.5
66 - 0500-3.5
1530 UT
Sp

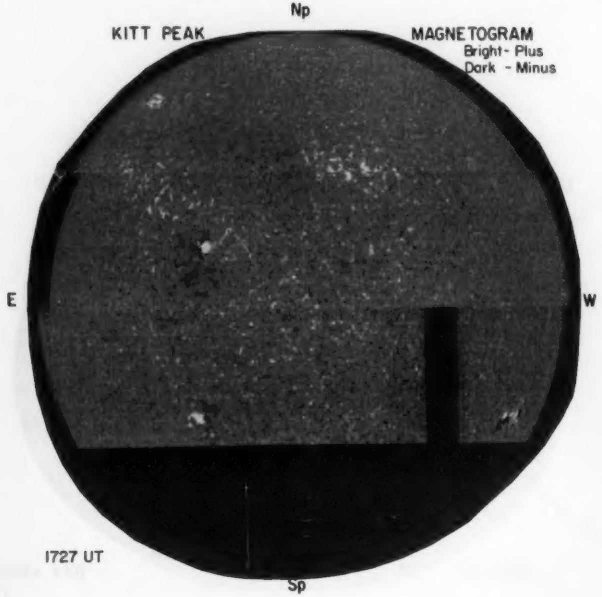

NELC LA POSTA
2.0 CM
Np
E
W
71
71
71
1819 UT
Sp
Ant. Temp. Unit 100°K

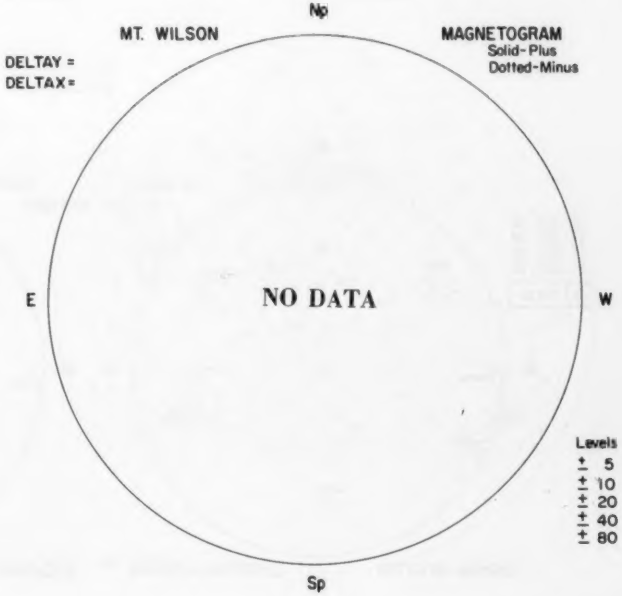

NELC LA POSTA
8.6 MM
Np
E
W
1644 UT
Sp
Ant. Temp. Unit 100°K

DECEMBER 18, 1976 (P = 8.77, B_0 = -1.35, L_0 = 182.30)





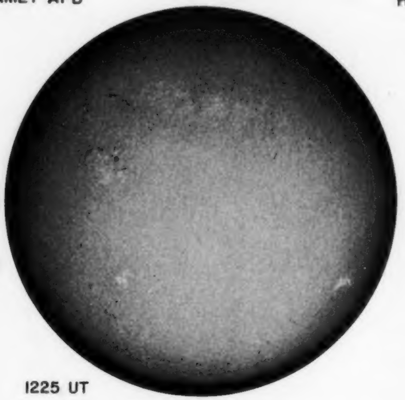




18

RAMEY AFB

Np

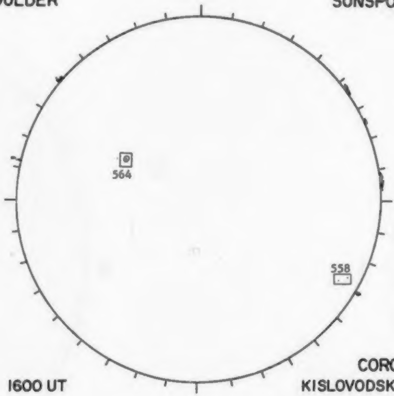
E  W

1225 UT

Sp

Ha BOULDER

Np

E  W

1600 UT

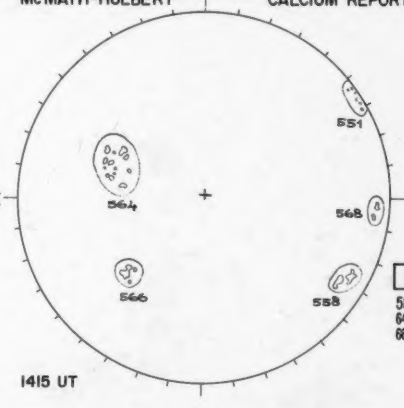
Sp

SUNSPOTS

CORONA
KISLOVODSK
NO DATA 190°,
195°,210°

McMATH-HULBERT CALCIUM REPORT

Np

E  W

1415 UT

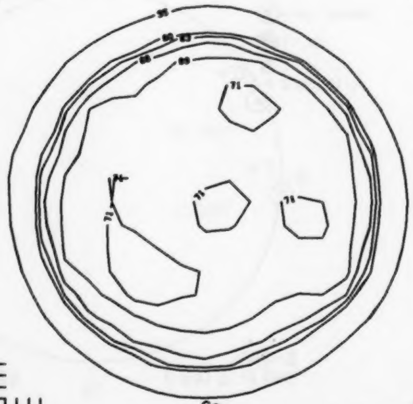
Sp

GOOD	D

58 - 1200 - 3.5
64 - 0900 - 2.5
66 - 0500 - 3.0

NELC LA POSTA 2.0 CM

Np

E  W

1828 UT

Sp

Ant. Temp. Unit 100°K

NELC LA POSTA 8.6 MM

Np

E

NO DATA

CLOUDY

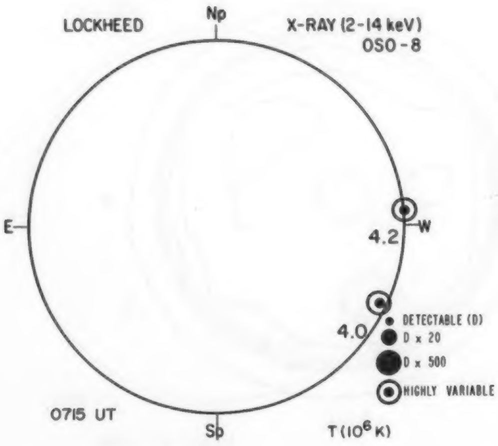
W

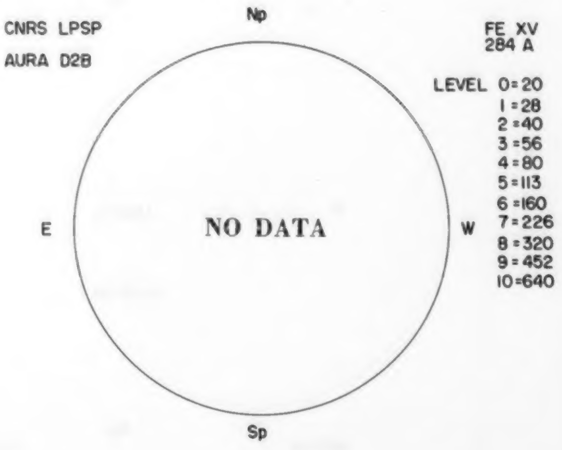
1918 UT

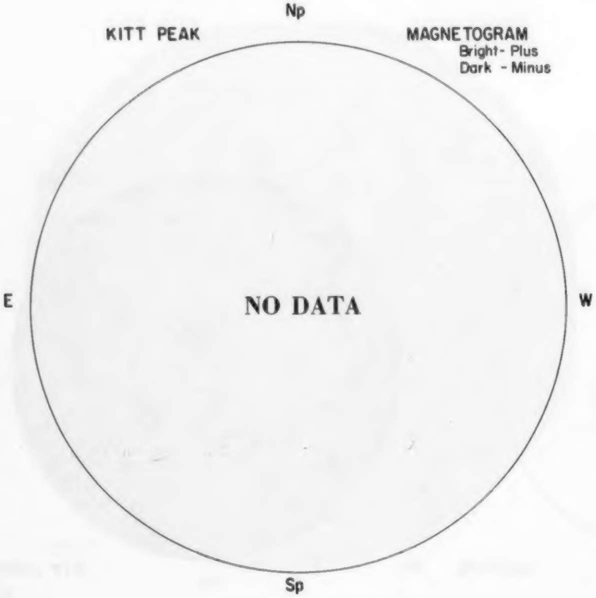
Sp

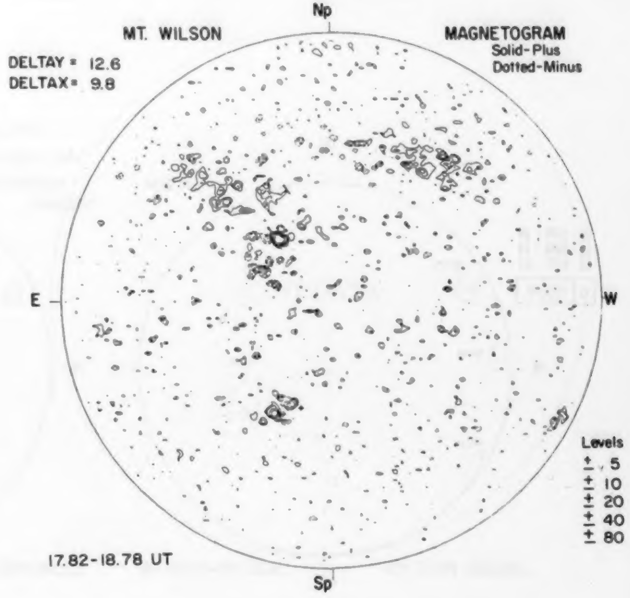
Ant. Temp. Unit 100°K

DECEMBER 19, 1976 (P =8.31, B_o =1.48, L_o =169.12)



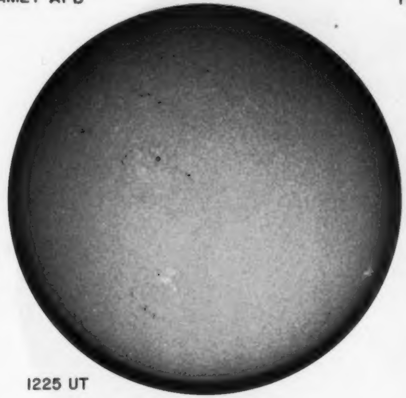






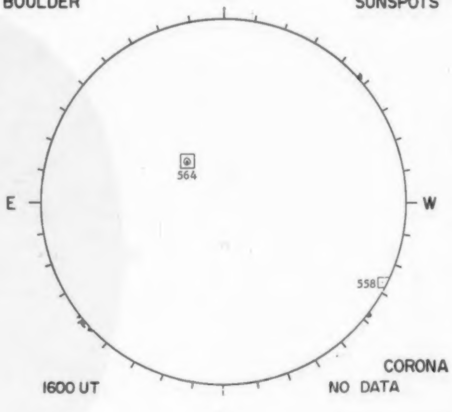
19

RAMEY AFB — Hα



1225 UT

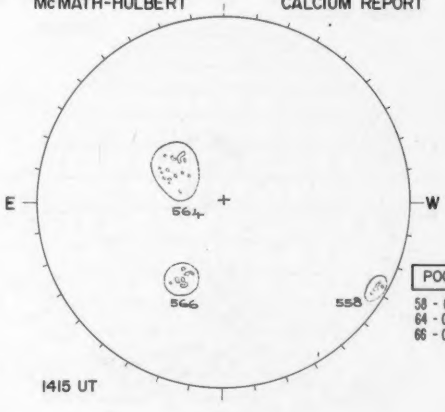
BOULDER — SUNSPOTS



1600 UT

CORONA
NO DATA

McMATH-HULBERT — CALCIUM REPORT



1415 UT

POOR	D

58 - 0900-30
64 - 0900-25
66 - 0500-30

NELC LA POSTA — 2.0 CM

Np
NO DATA
E CLOUDY W
Sp

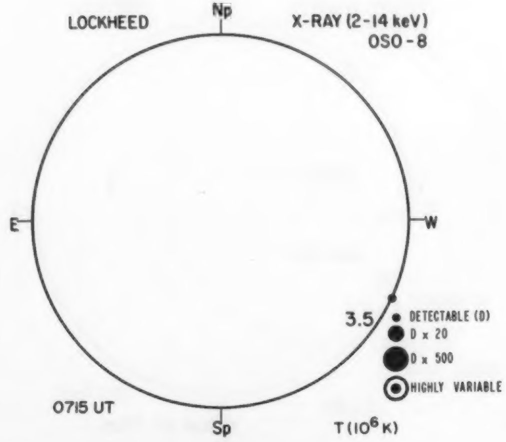
1756 UT — Ant. Temp. Unit 100°K

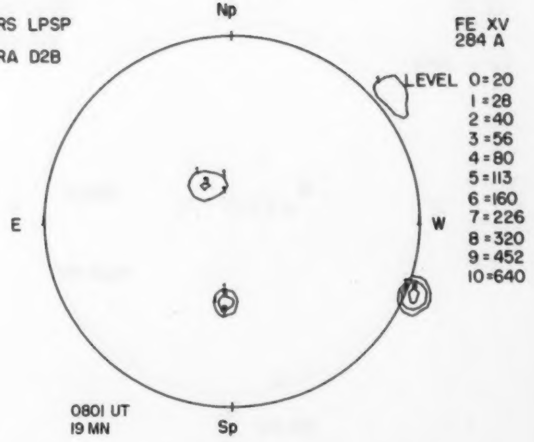
NELC LA POSTA — 8.6 MM

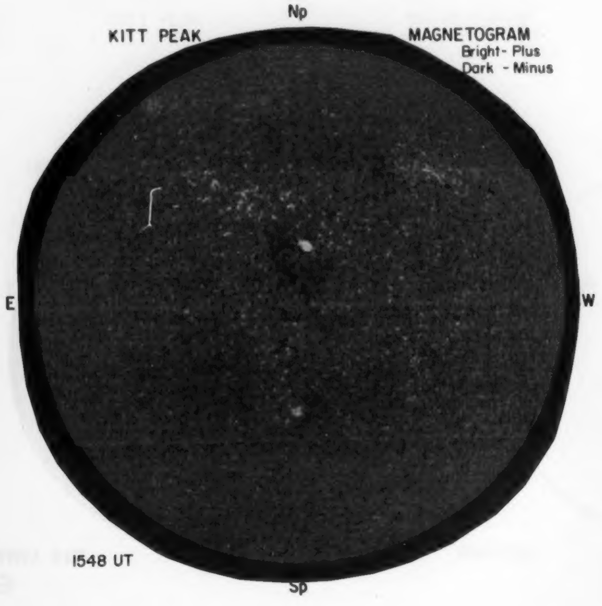
Np
NO DATA
E CLOUDY W
Sp

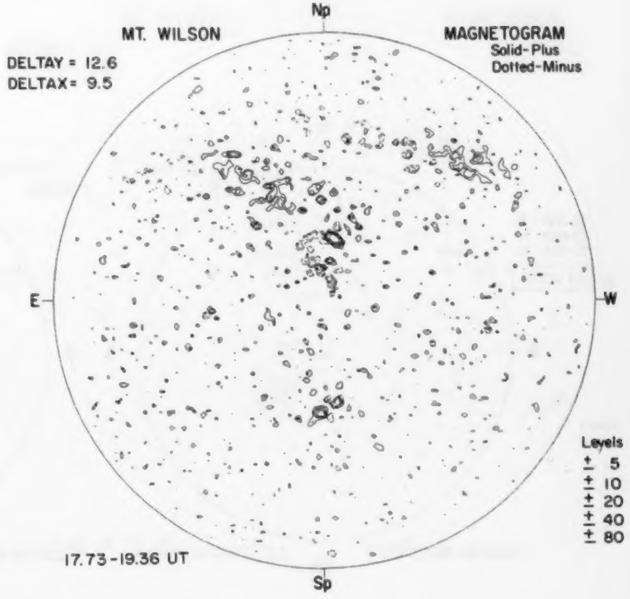
1851 UT — Ant. Temp. Unit 100°K

DECEMBER 20, 1976 (P = 7.84, B_0 = -1.60, L_0 = 155.95)



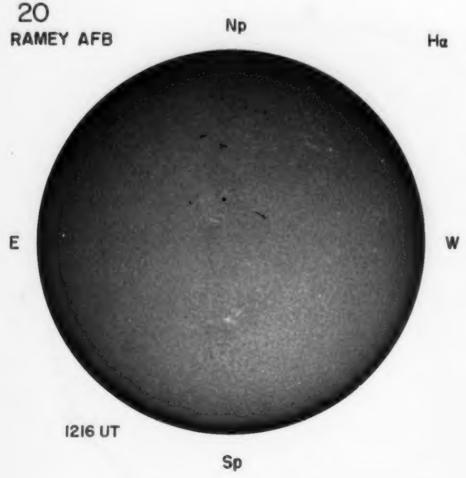




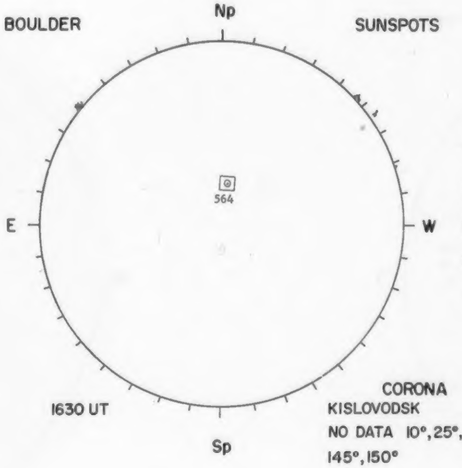


20

RAMEY AFB Hα

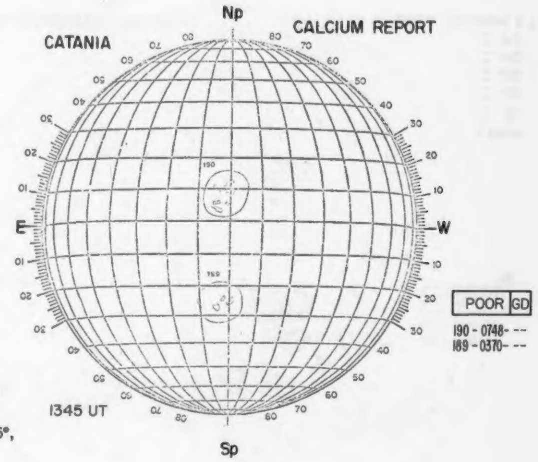


BOULDER SUNSPOTS

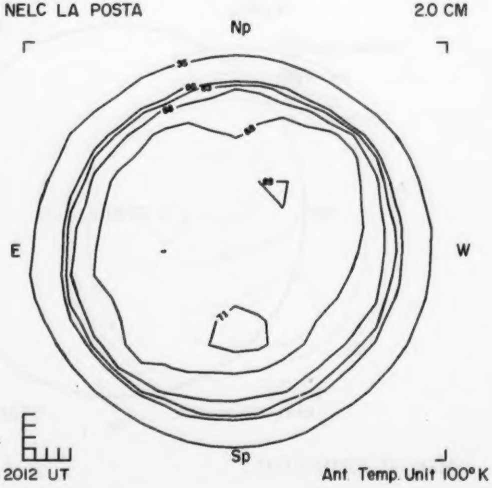


CORONA
KISLOVODSK
NO DATA 10°, 25°, 145°, 150°

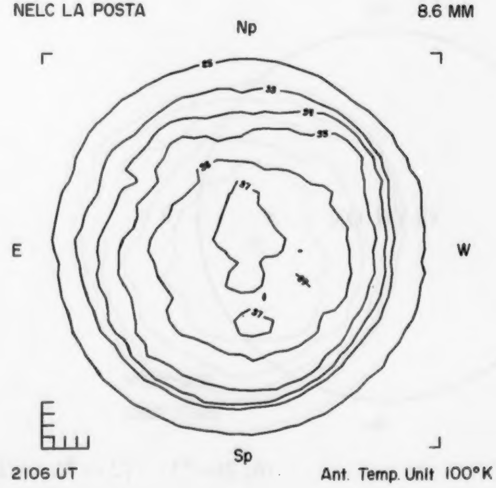
CATANIA CALCIUM REPORT



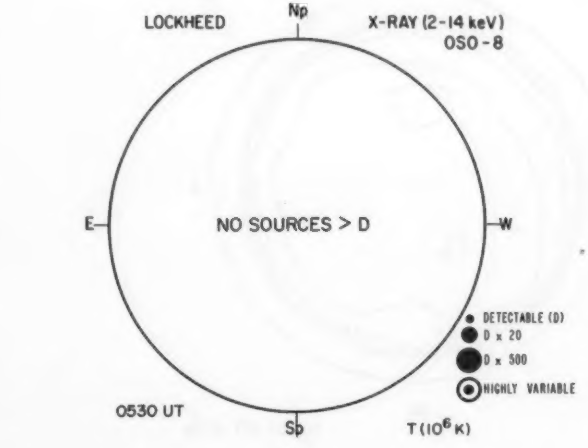
NELC LA POSTA 2.0 CM

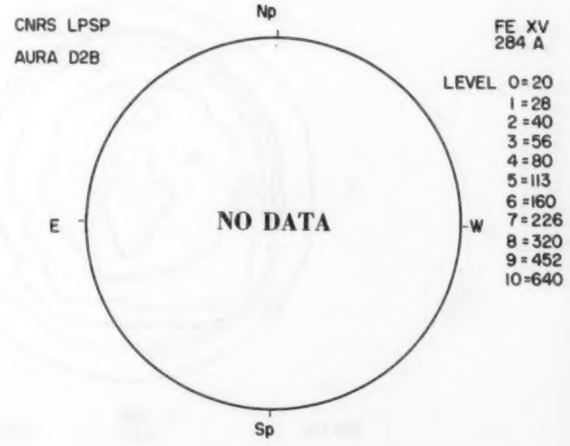


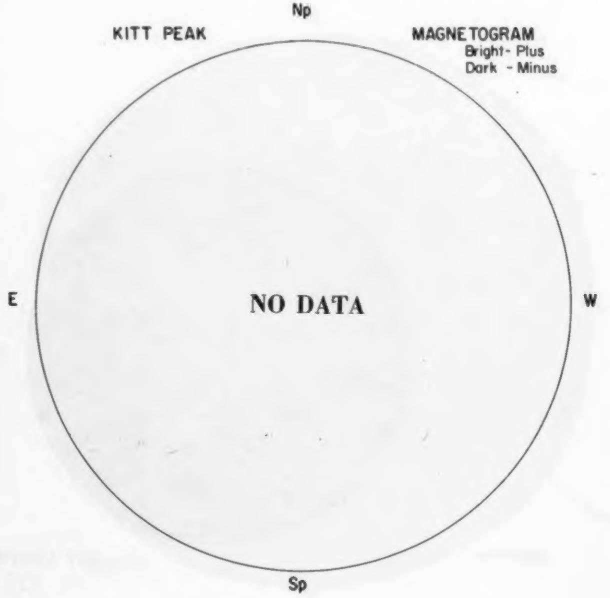
NELC LA POSTA 8.6 MM

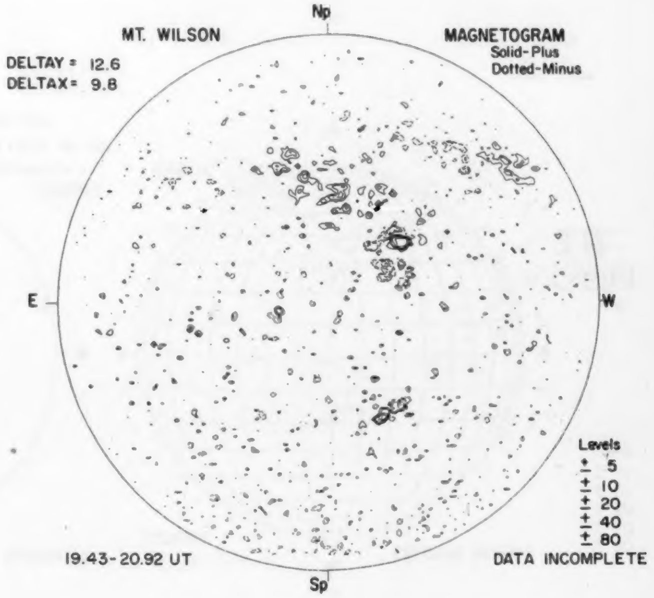


DECEMBER 21, 1976 (P = 7.37, B_0 = -1.73, L_0 = 142.78)



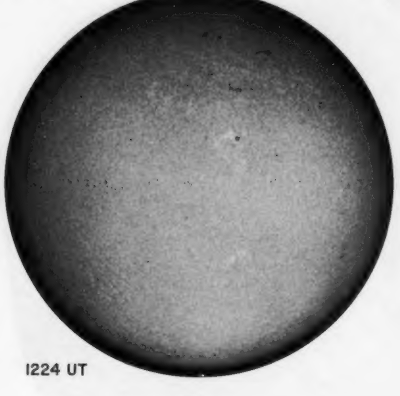






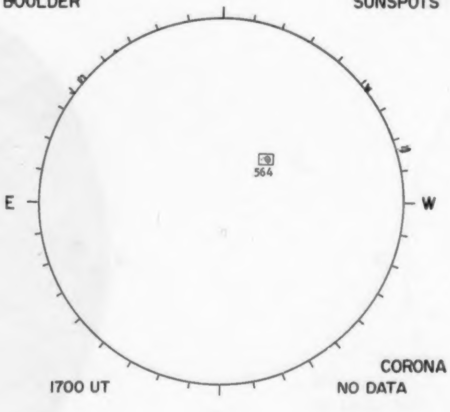
21

RAMEY AFB Hα



1224 UT

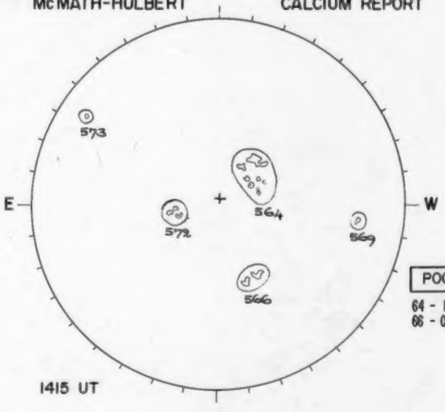
BOULDER SUNSPOTS



1700 UT

CORONA
NO DATA

McMATH-HULBERT CALCIUM REPORT

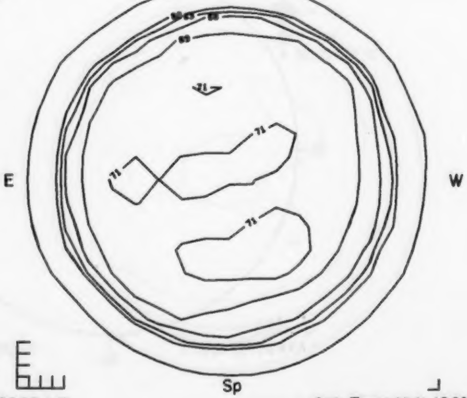


1415 UT

POOR	D

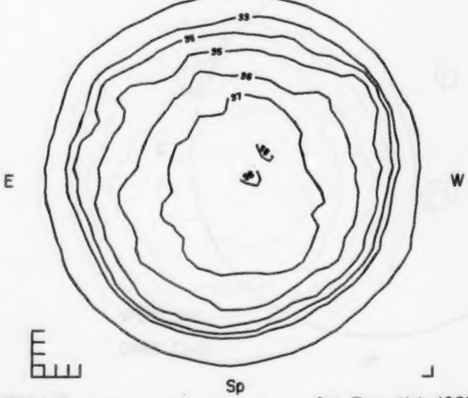
64 - 1000-3.5
66 - 0500-3.0

NELC LA POSTA 2.0 CM



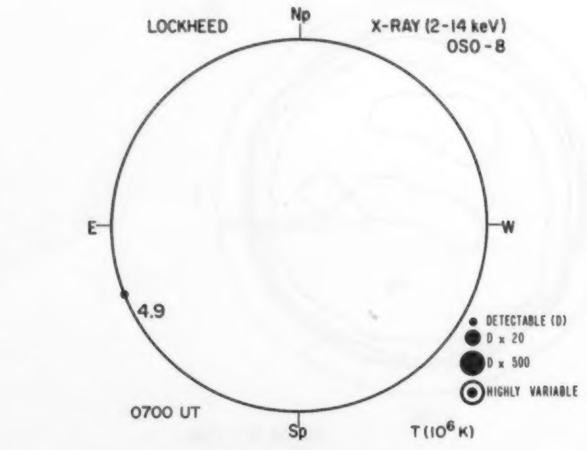
2046 UT
Ant. Temp. Unit 100°K

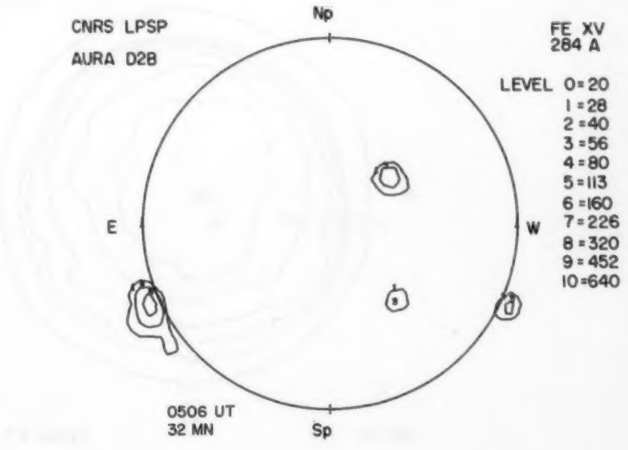
NELC LA POSTA 8.6 MM

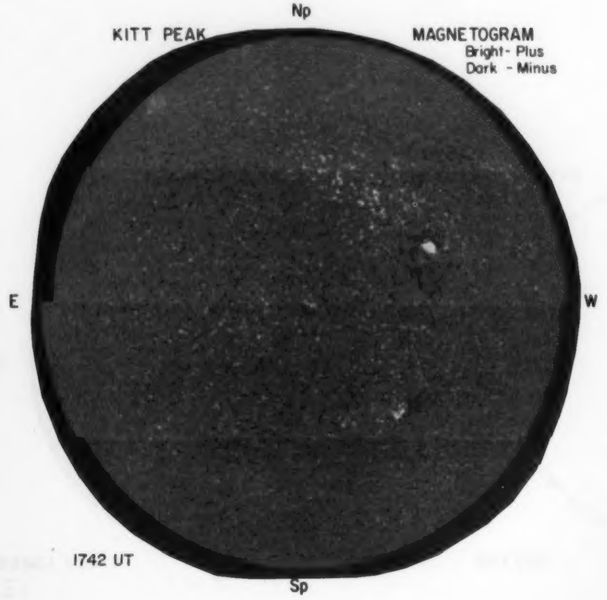


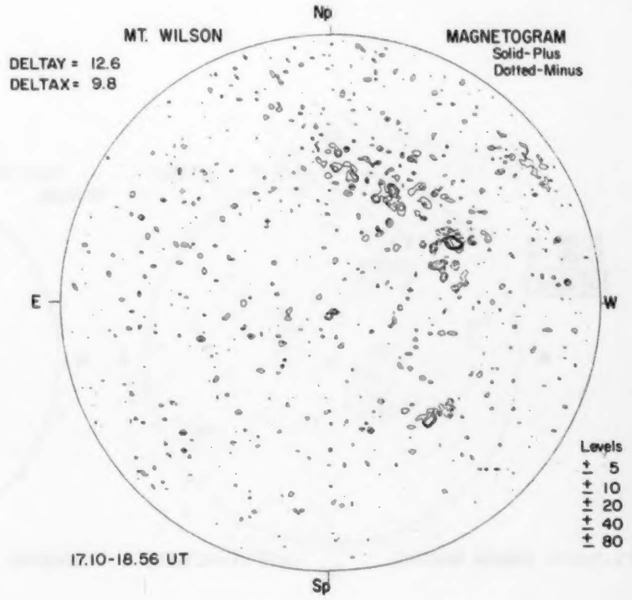
1914 UT
Ant. Temp. Unit 100°K

DECEMBER 22, 1976 (P = 6.89, B_o = 1.85, L_o = 129.60)

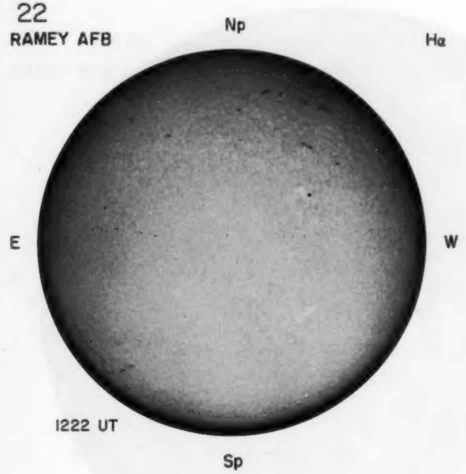




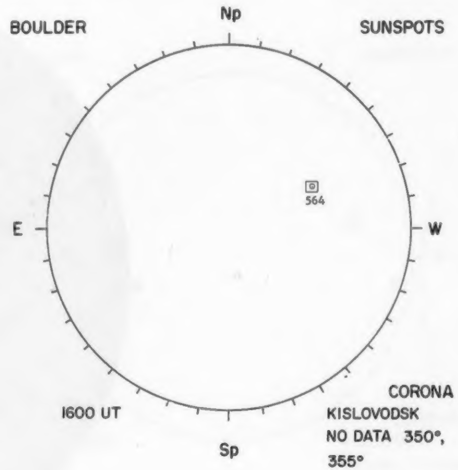




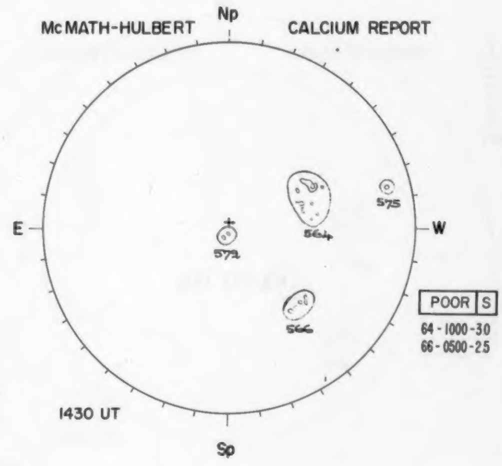
22



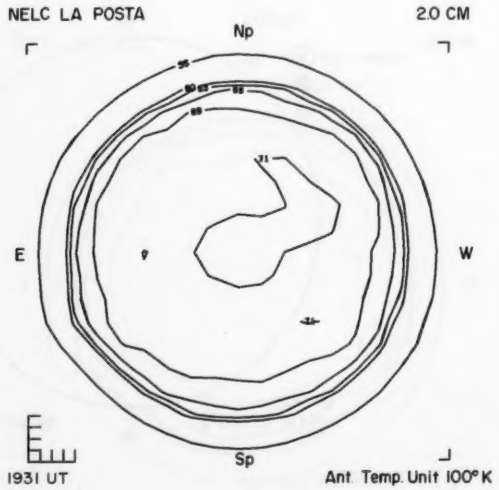
RAMEY AFB
Hα
Np
E
W
Sp
1222 UT



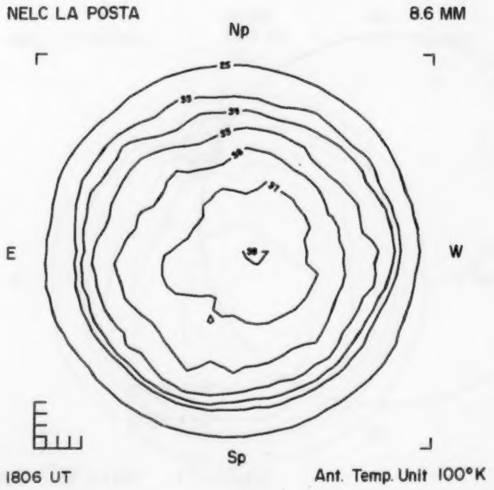
BOULDER
SUNSPOTS
Np
E
W
Sp
564
1600 UT
CORONA
KISLOVODSK
NO DATA 350°,
355°



McMATH-HULBERT
CALCIUM REPORT
Np
E
W
Sp
575
564
572
566
1430 UT
POOR S
64-1000-30
66-0500-25

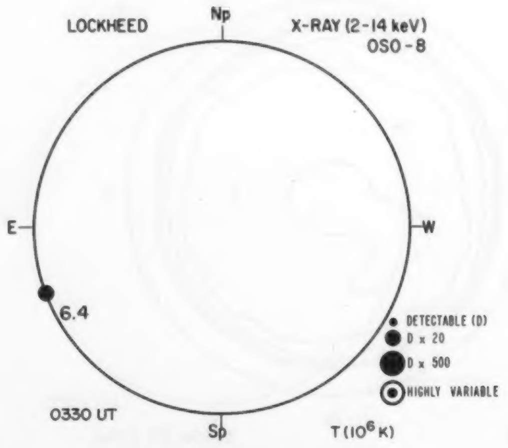


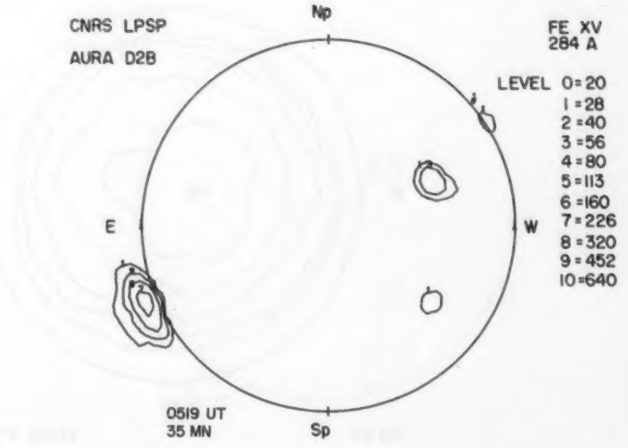
NELC LA POSTA
2.0 CM
Np
E
W
Sp
1931 UT
Ant. Temp. Unit 100°K

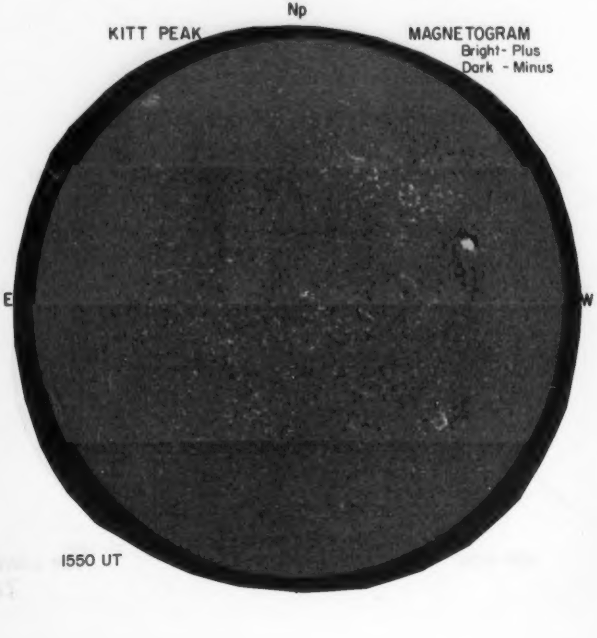


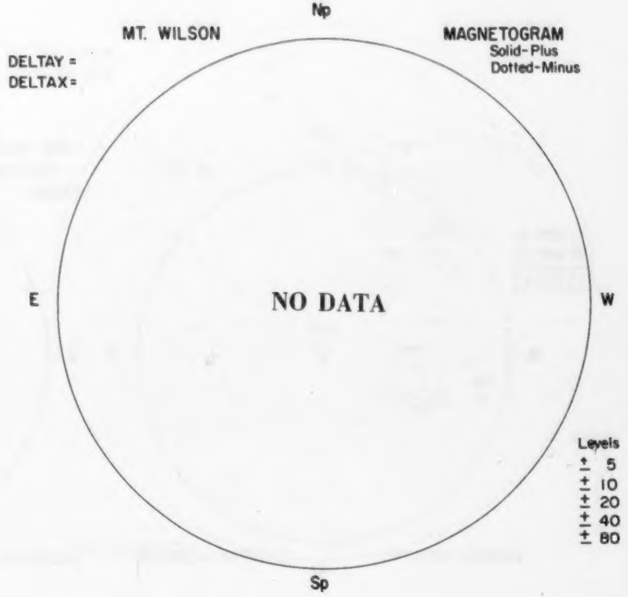
NELC LA POSTA
8.6 MM
Np
E
W
Sp
1806 UT
Ant. Temp. Unit 100°K

DECEMBER 23, 1976 (P = 6.42, B_0 = -1.98, L_0 = 116.43)



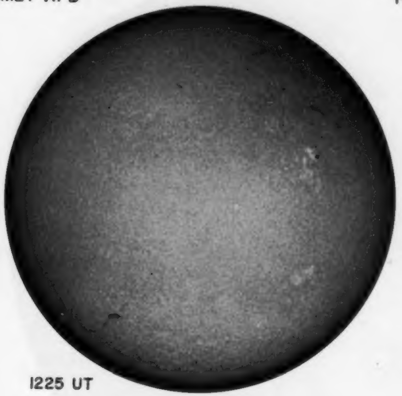






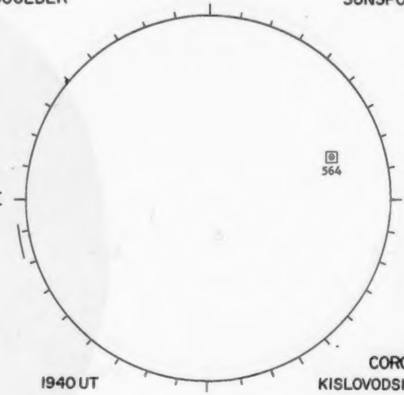
23

RAMEY AFB Hα



1225 UT

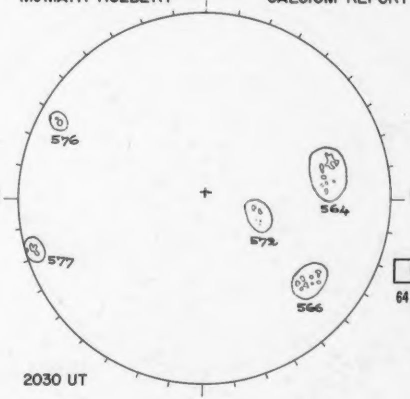
BOULDER SUNSPOTS



1940 UT

CORONA
KISLOVODSK
NO DATA 5°,220°

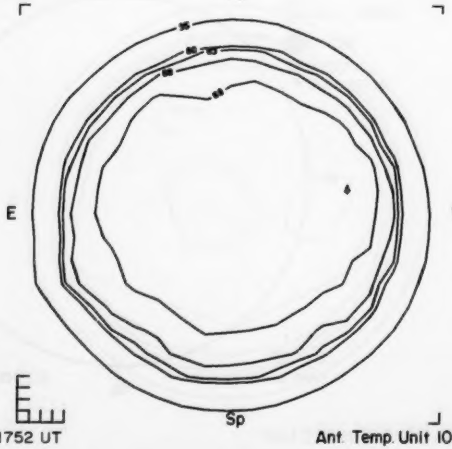
McMATH-HULBERT CALCIUM REPORT



2030 UT

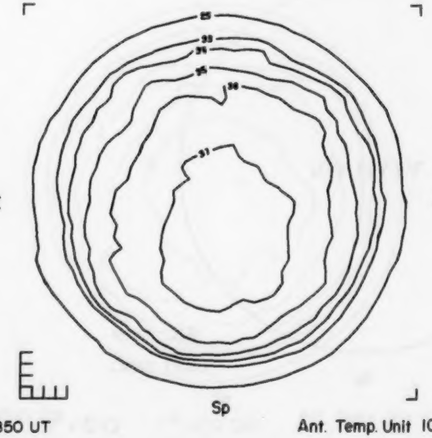
FAIR | D
64 - 0900 - 30

NELC LA POSTA 2.0 CM



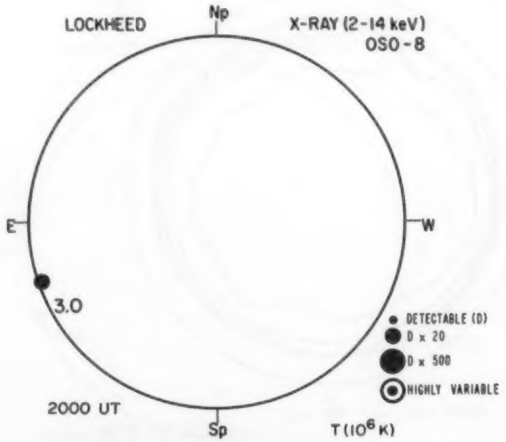
1752 UT Ant. Temp. Unit 100°K

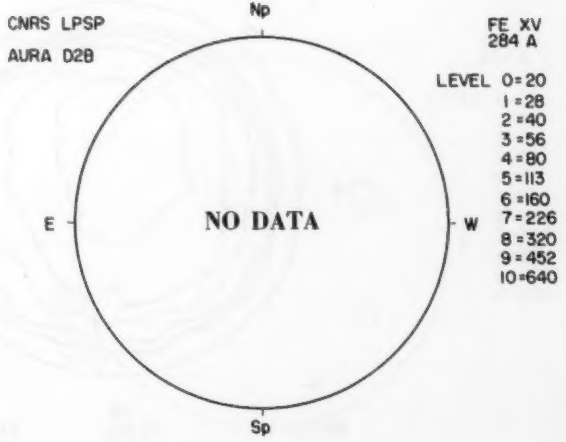
NELC LA POSTA 8.6 MM

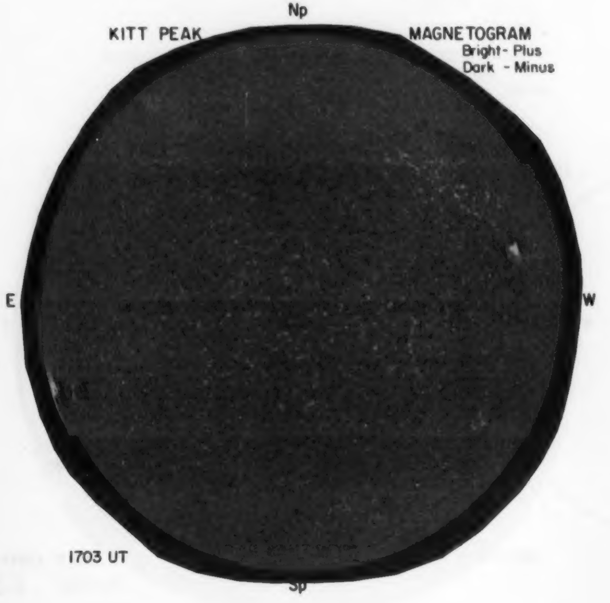


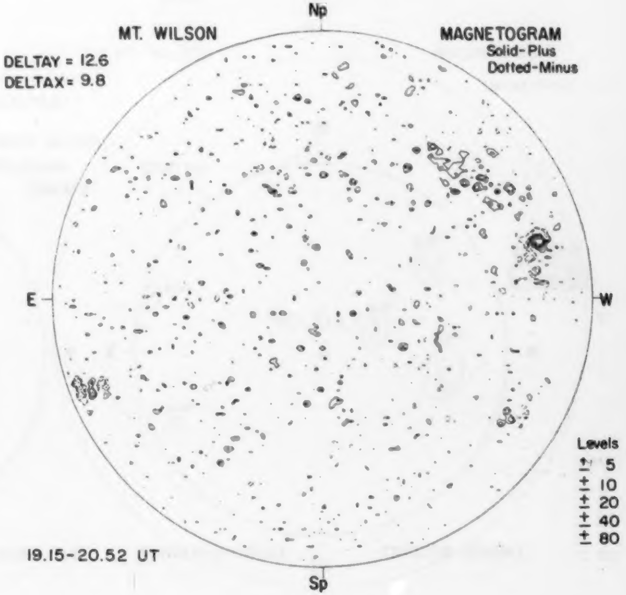
1850 UT Ant. Temp. Unit 100°K

DECEMBER 24, 1976 (P =5.94, B_0 =-2.10, L_0 =103.26)



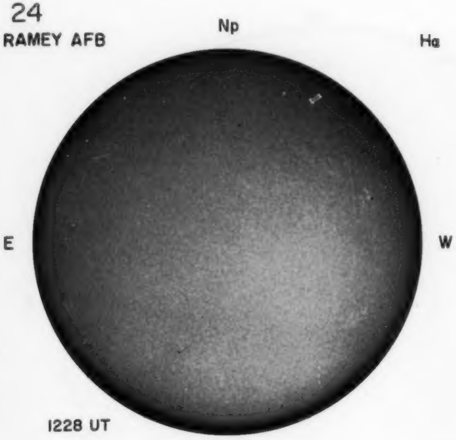




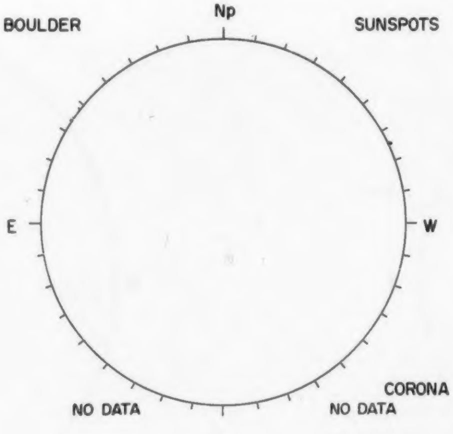


24

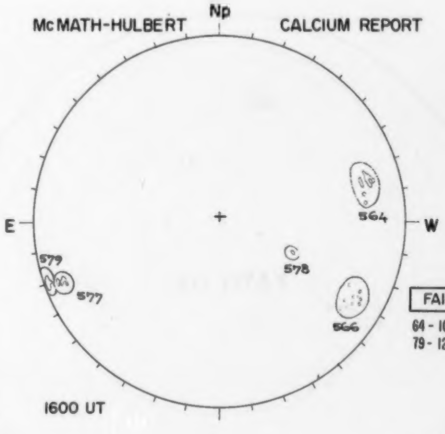
RAMEY AFB Hα 1228 UT



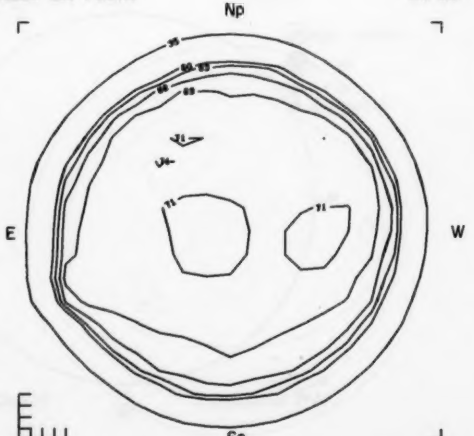
BOULDER SUNSPOTS / CORONA



McMATH-HULBERT CALCIUM REPORT 1600 UT

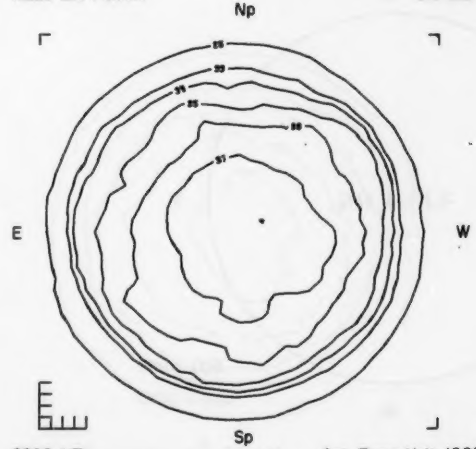


NELC LA POSTA 2.0 CM 1823 UT



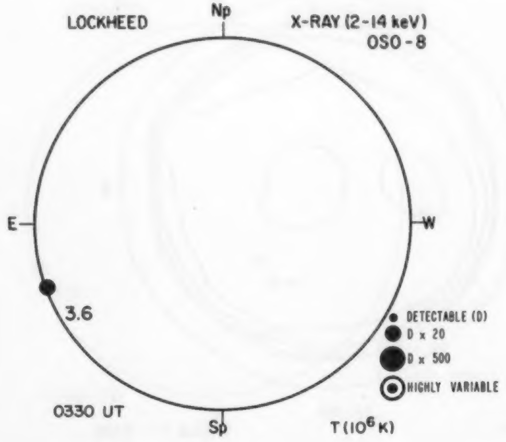
Ant. Temp. Unit 100°K

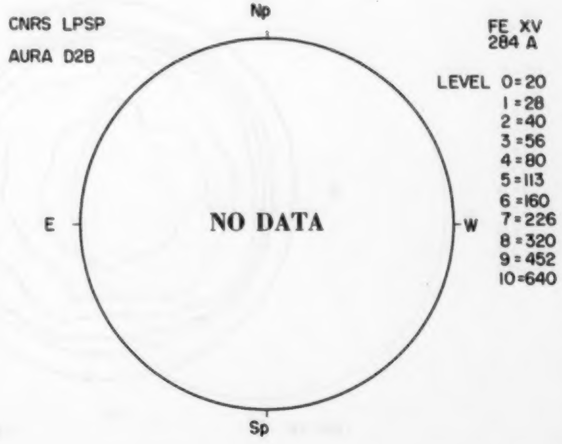
NELC LA POSTA 8.6 MM 2008 UT

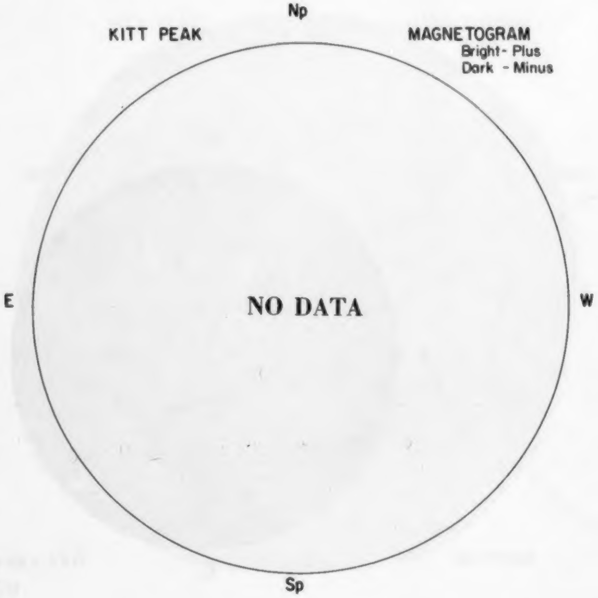


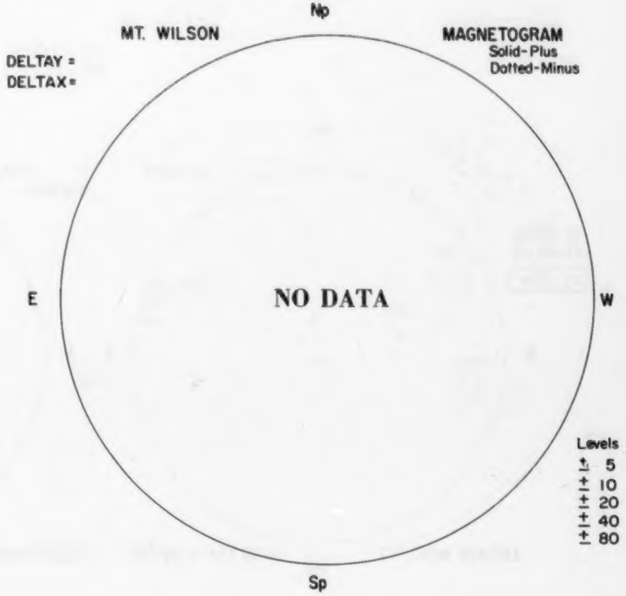
Ant. Temp. Unit 100°K

DECEMBER 25, 1976 (P = 5.46, B_0 = -2.22, L_0 = 90.09)



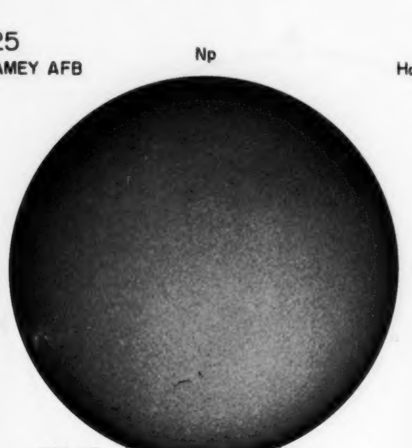






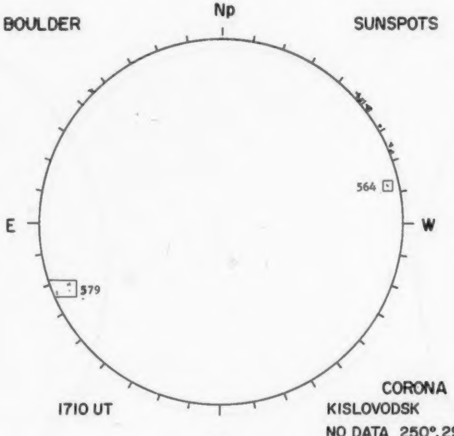
25

RAMEY AFB



1306 UT

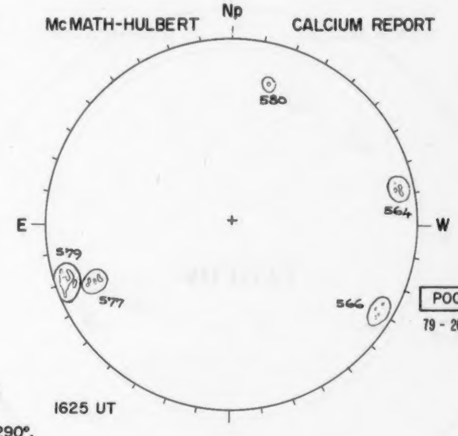
Hα BOULDER



1710 UT

SUNSPOTS McMATH-HULBERT

CALCIUM REPORT



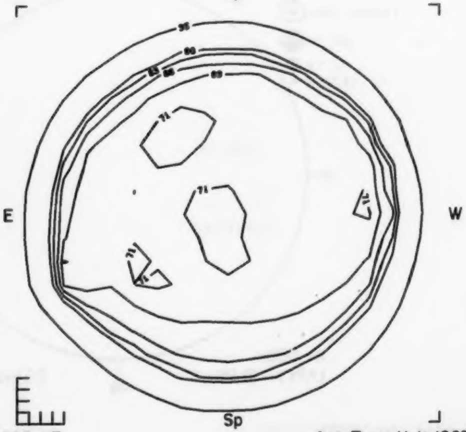
1625 UT

POOR | S

79 - 2000-35

CORONA
KISLOVODSK
NO DATA 250°, 290°,
320°-330°, 345°-355°

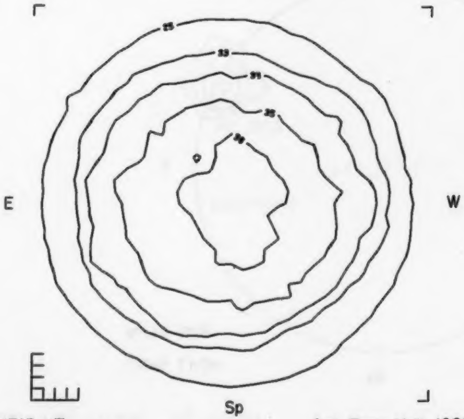
NELC LA POSTA 2.0 CM



1625 UT

Ant. Temp. Unit 100°K

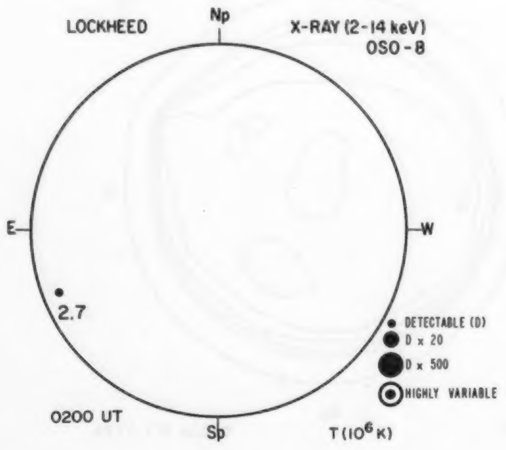
NELC LA POSTA 8.6 MM

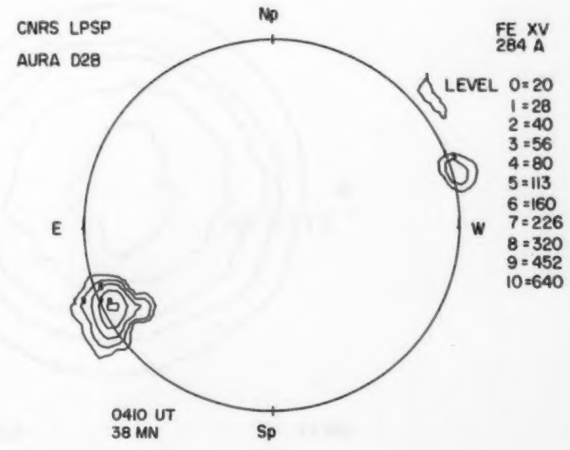


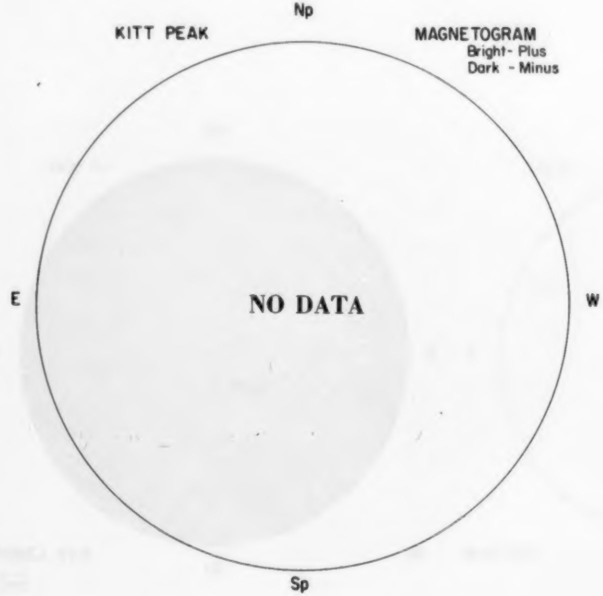
1713 UT

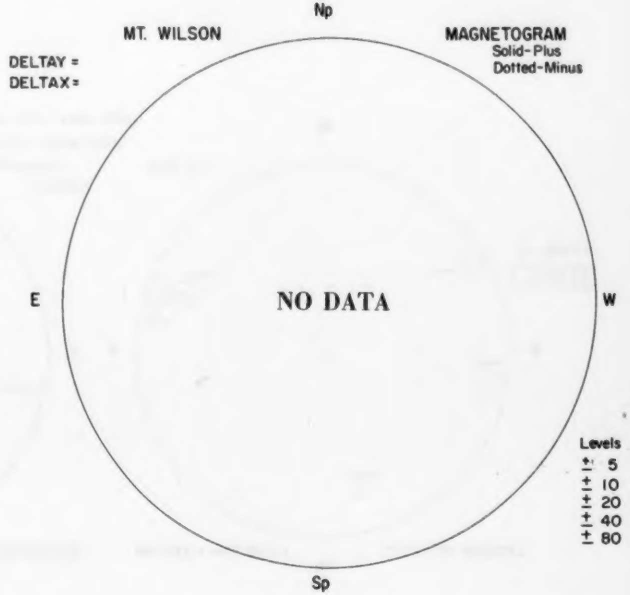
Ant. Temp. Unit 100°K

DECEMBER 26, 1976 (P = 4.98, B_0 = -2.34, L_0 = 76.91)



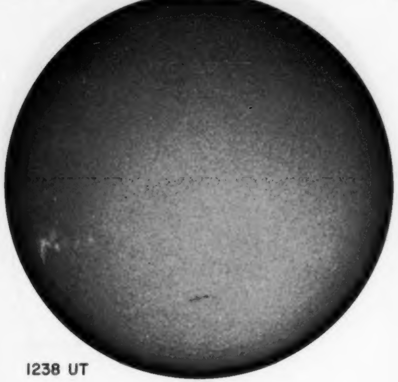






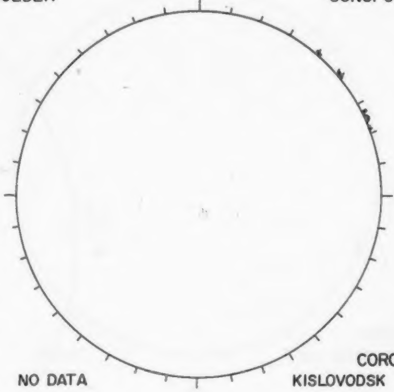
26

RAMEY AFB   Np   Hα

E  W

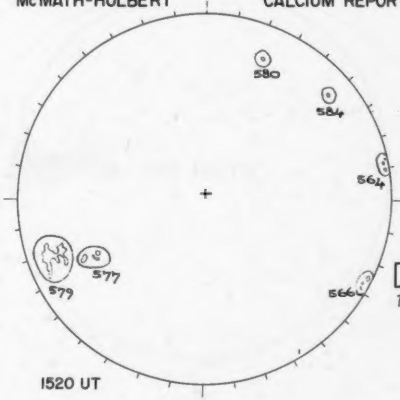
1238 UT   Sp

BOULDER   Np   SUNSPOTS

E  W

NO DATA   Sp   CORONA KISLOVODSK

McMATH-HULBERT   Np   CALCIUM REPORT

E  W

FAIR | S

79 - 2200-4.0

1520 UT   Sp

NELC LA POSTA   Np   2.0 CM

NO DATA

E   EQUIPMENT   W

---- UT   Sp   Ant. Temp. Unit 100°K

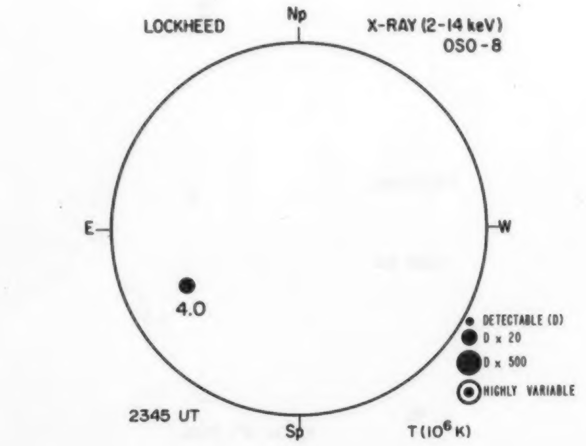
NELC LA POSTA   Np   8.6 MM

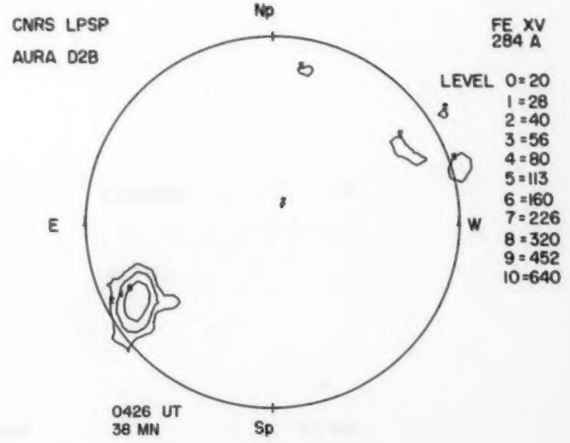
NO DATA

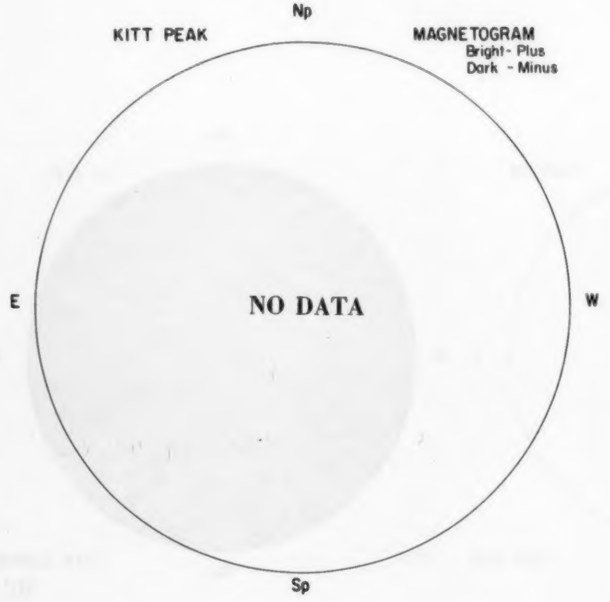
E   EQUIPMENT   W

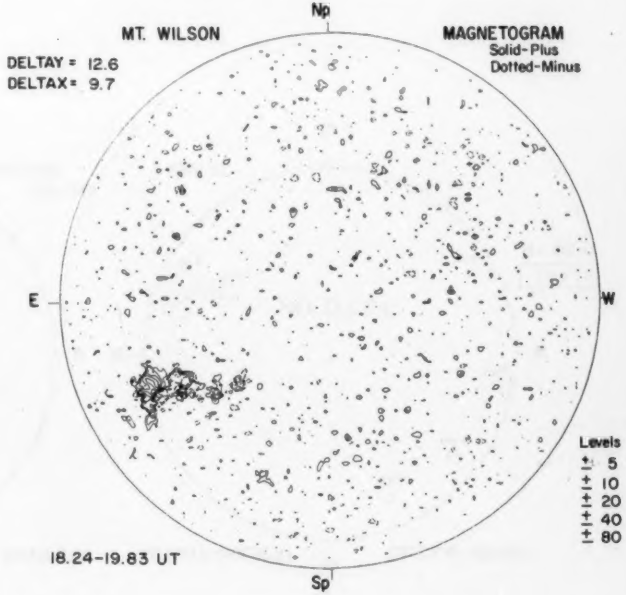
---- UT   Sp   Ant. Temp. Unit 100°K

DECEMBER 27, 1976 (P =4.50, B_0 =-2.47, L_0 =63.74)

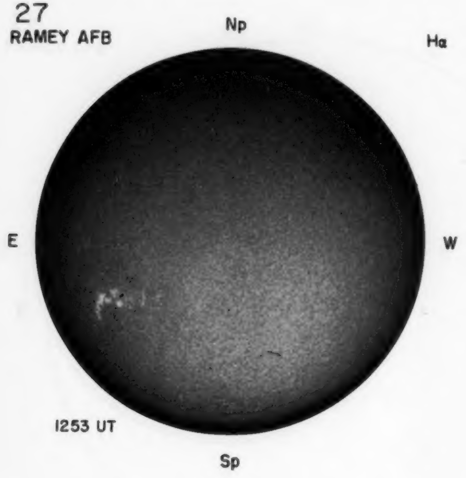


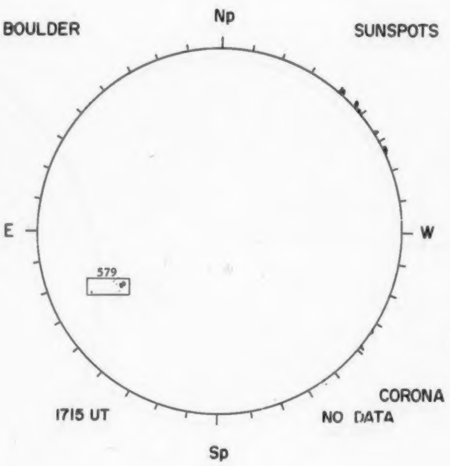


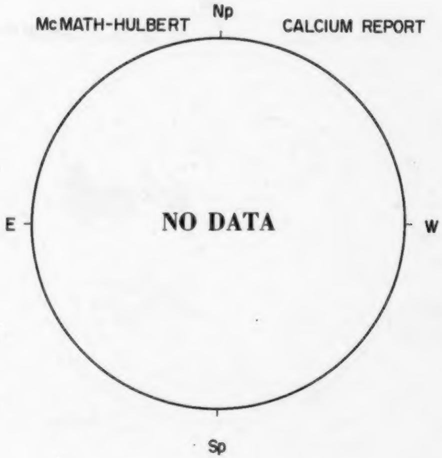




27


RAMEY AFB
Np
Hα
E
W
1253 UT
Sp

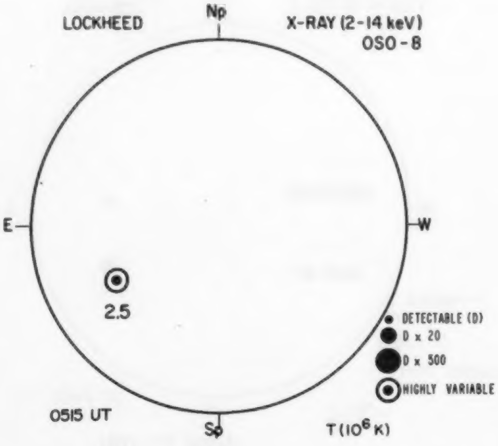

BOULDER
Np
SUNSPOTS
E
W
579
1715 UT
CORONA
NO DATA
Sp

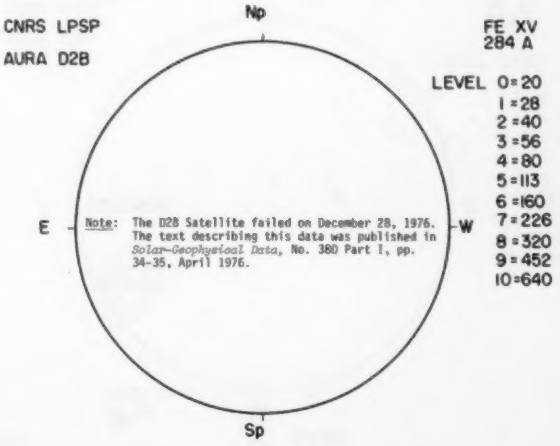

McMATH-HULBERT
Np
CALCIUM REPORT
E
W
NO DATA
Sp

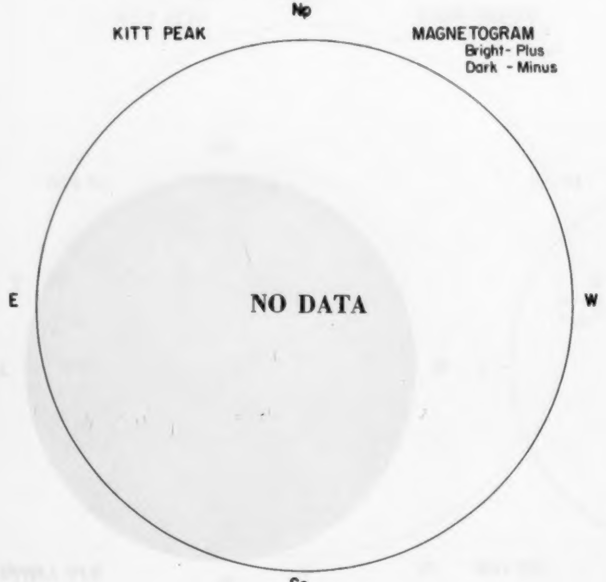
NELC LA POSTA
Np
2.0 CM
NO DATA
E
EQUIPMENT
W
---- UT
Sp
Ant. Temp. Unit 100°K

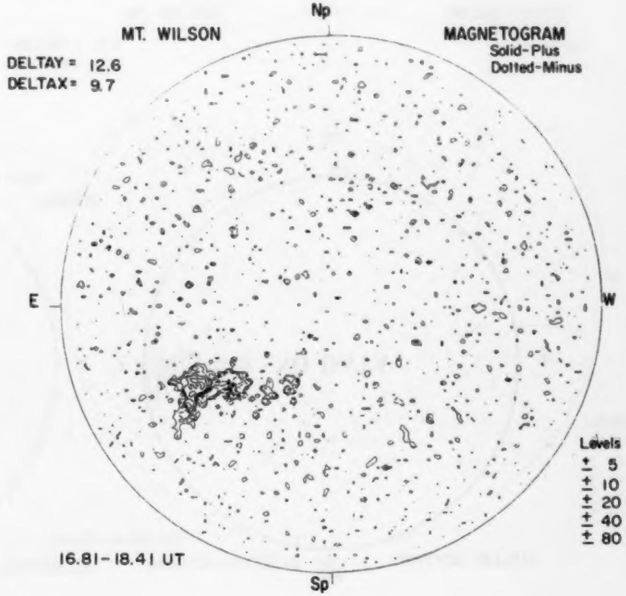
NELC LA POSTA
Np
8.6 MM
NO DATA
E
EQUIPMENT
W
---- UT
Sp
Ant. Temp. Unit 100°K

DECEMBER 28, 1976 (P =4.01, B_0 =-2.59, L_0 =50.57)

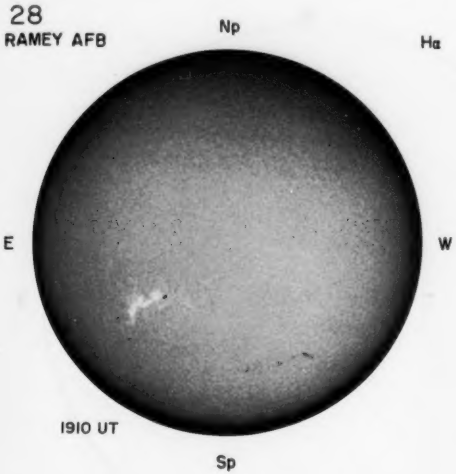


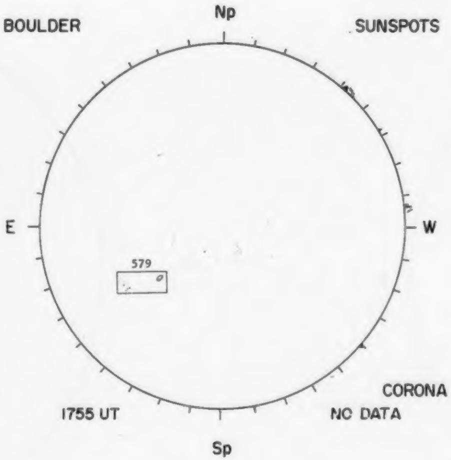


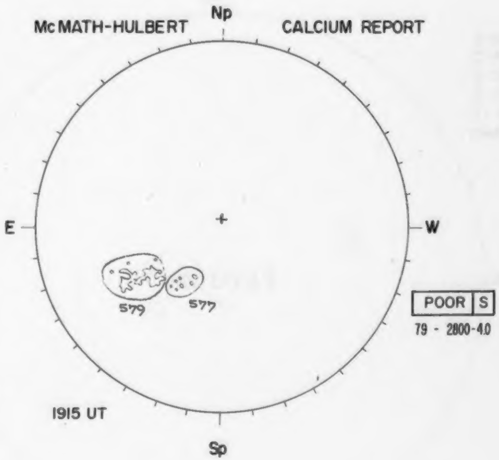




28







NELC LA POSTA   Np   2.0 CM

NØ DATA

E   EQUIPMENT   W

---- UT   Sp   Ant. Temp. Unit 100°K

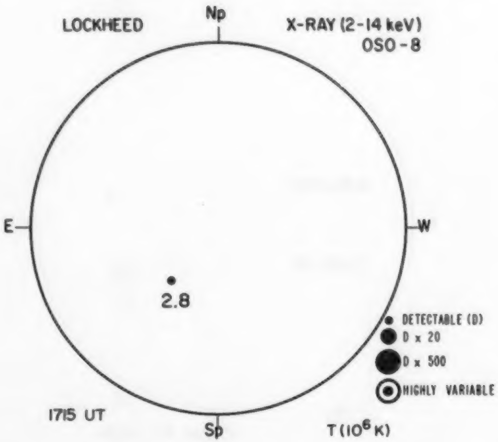
NELC LA POSTA   Np   8.6 MM

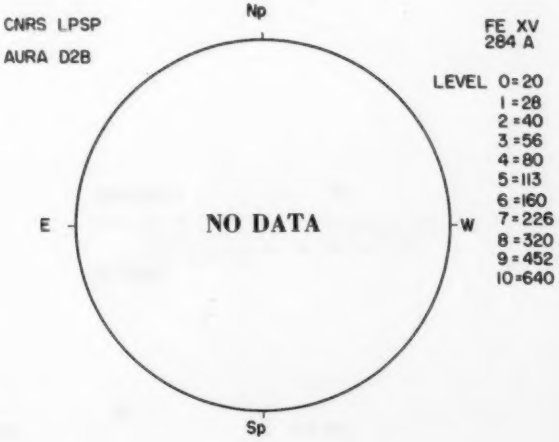
NØ DATA

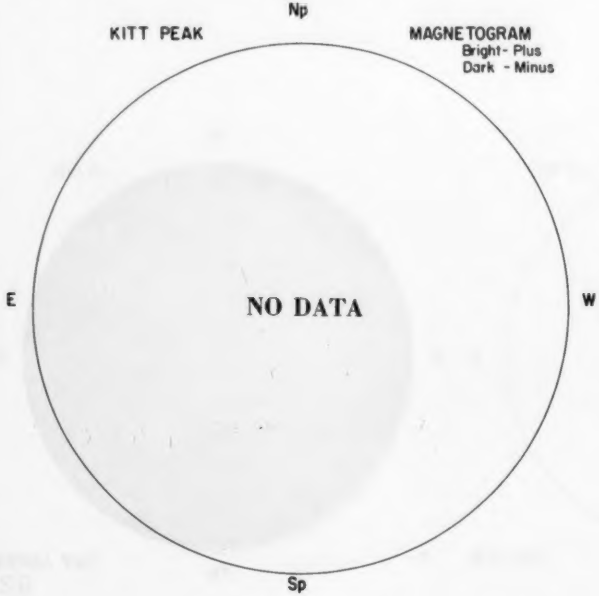
E   EQUIPMENT   W

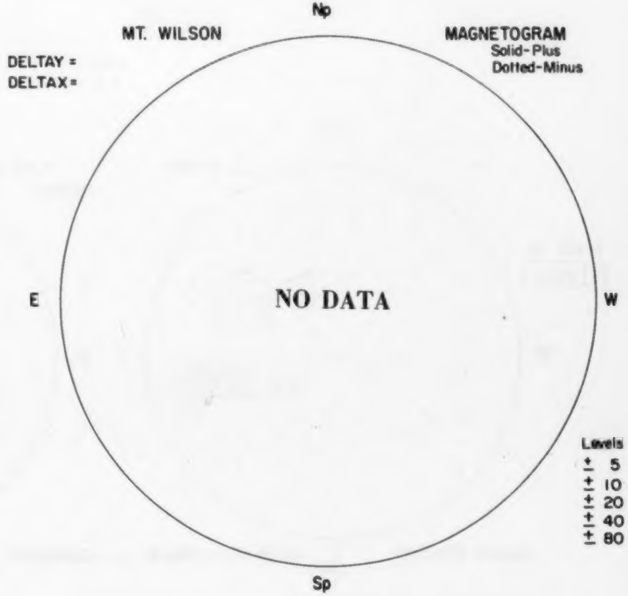
---- UT   Sp   Ant. Temp. Unit 100°K

DECEMBER 29, 1976 (P = 3.53, B_o = -2.71, L_o = 37.40)



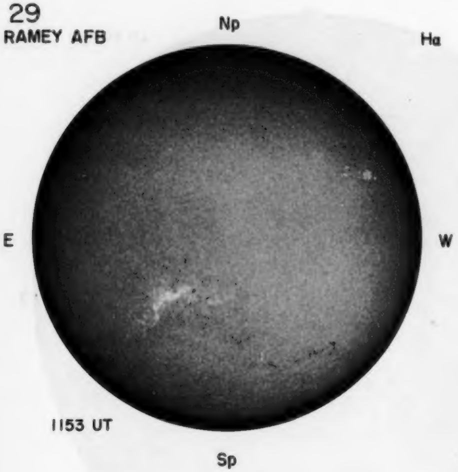




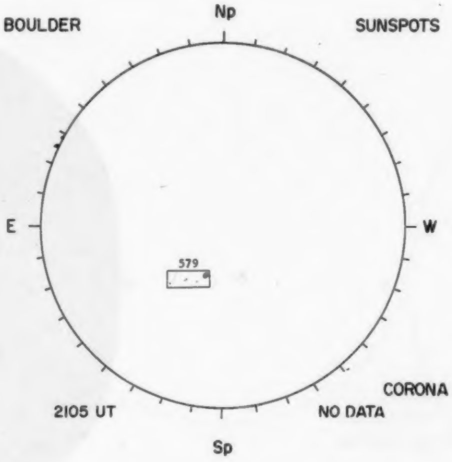


29

RAMEY AFB Hα 1153 UT

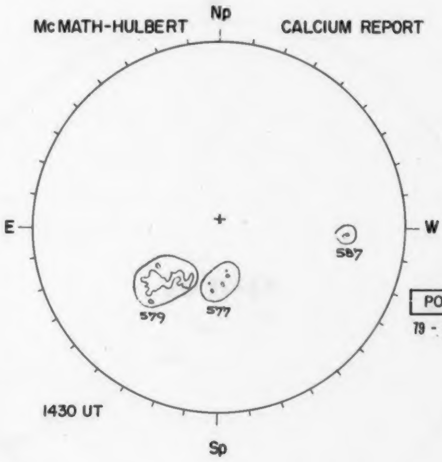


BOULDER SUNSPOTS 2105 UT



CORONA
NO DATA

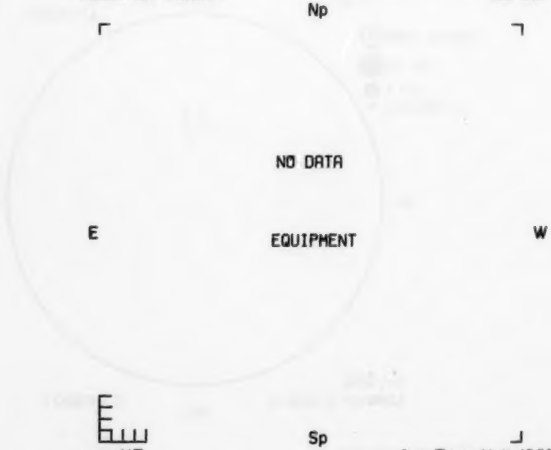
McMATH-HULBERT CALCIUM REPORT 1430 UT



POOR	S

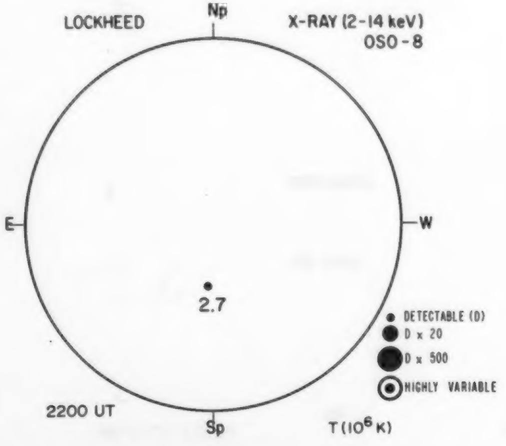
79 - 3000-4.0

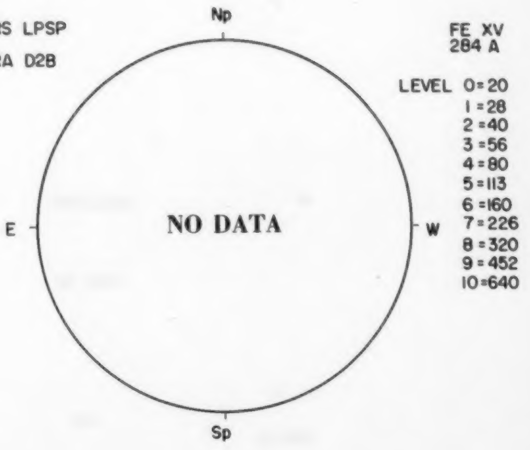
NELC LA POSTA 2.0 CM

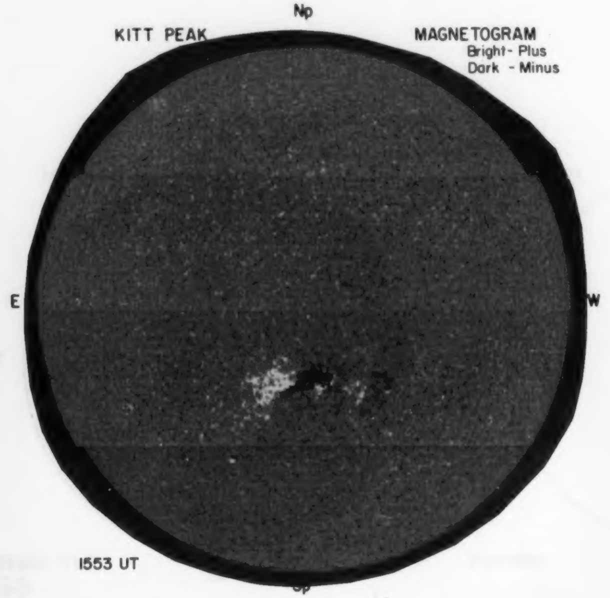


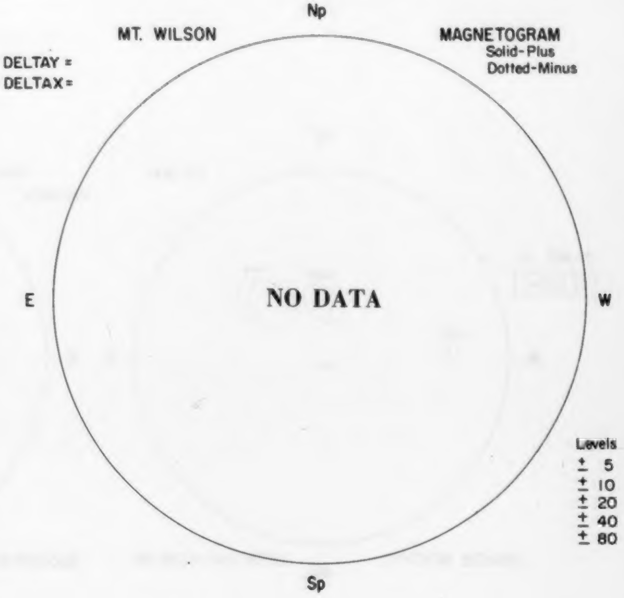
NELC LA POSTA 8.6 MM

DECEMBER 30, 1976 (P = 3.05, B_o = -2.82, L_o = 24.23)



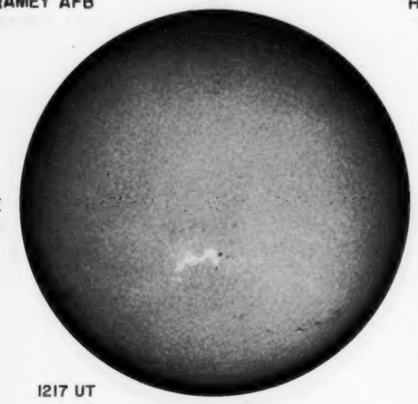






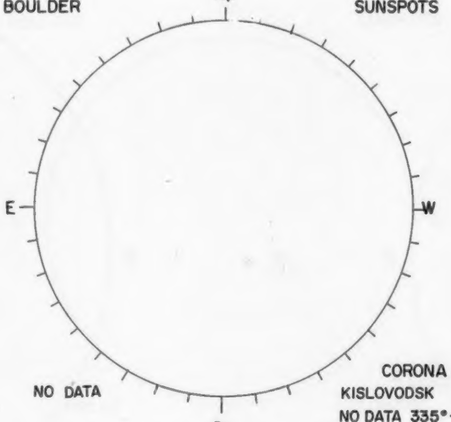
30

RAMEY AFB Np Hα



1217 UT Sp

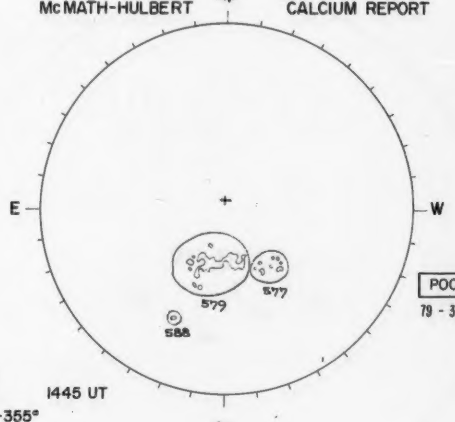
BOULDER Np SUNSPOTS



NO DATA Sp

CORONA
KISLOVODSK
NO DATA 335°-355°

McMATH-HULBERT Np CALCIUM REPORT



POOR | D
79 - 3000-35

1445 UT Sp

NELC LA POSTA Np 2.0 CM

E NO DATA EQUIPMENT W

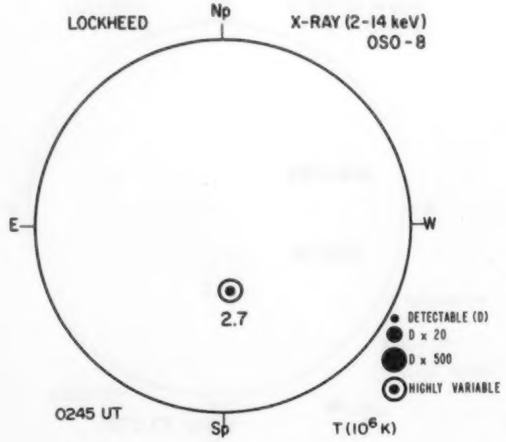
---- UT Sp Ant. Temp. Unit 100°K

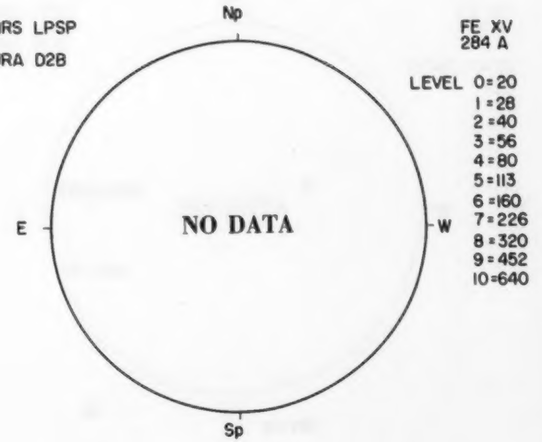
NELC LA POSTA Np 8.6 MM

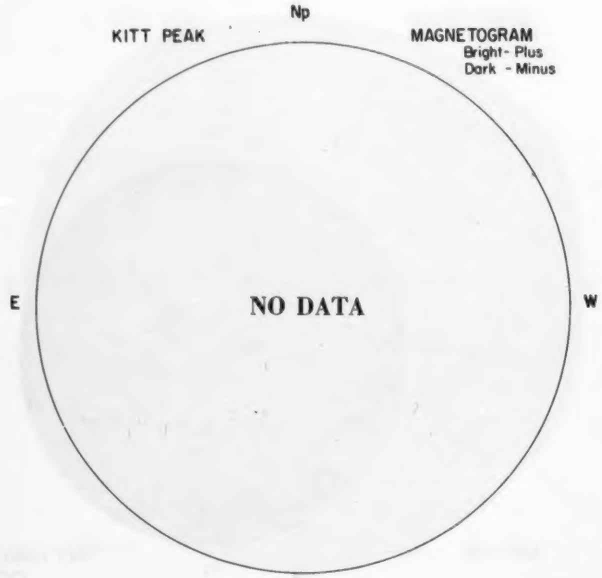
E NO DATA EQUIPMENT W

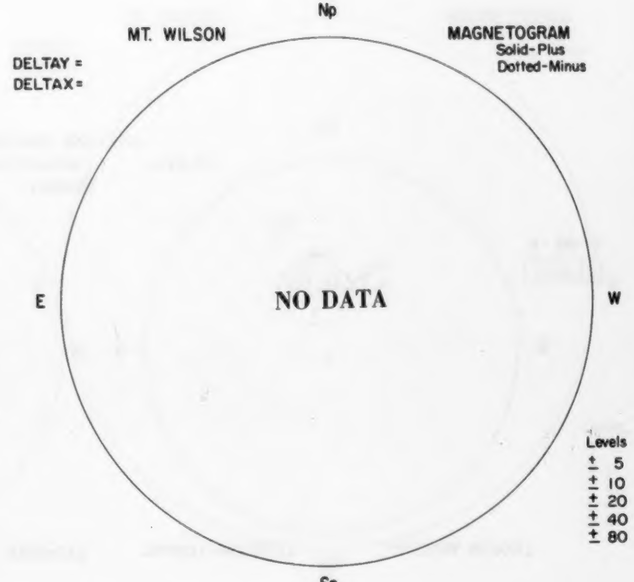
---- UT Sp Ant. Temp. Unit 100°K

DECEMBER 31, 1976 (P=2.56, B_o=-2.94, L_o=11.06)

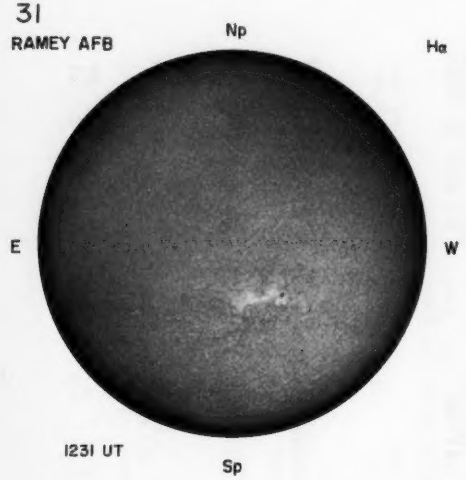


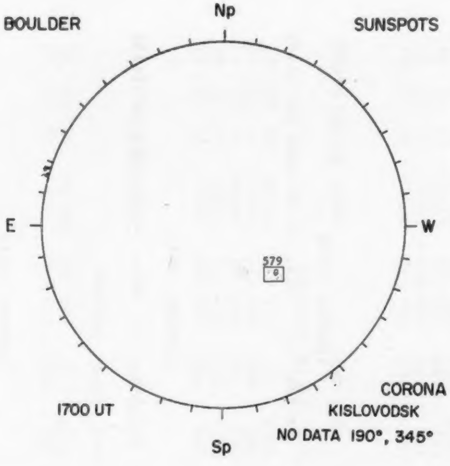


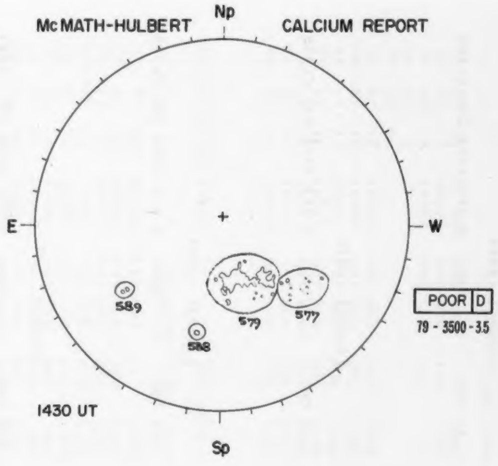




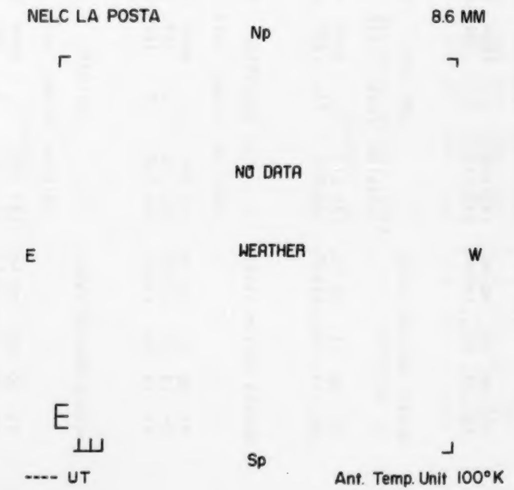
31


RAMEY AFB
Hα
Np
E
W
Sp
1231 UT


BOULDER
SUNSPOTS
Np
E
W
Sp
579
1700 UT
CORONA
KISLOVODSK
NO DATA 190°, 345°


McMATH-HULBERT
CALCIUM REPORT
Np
E
W
Sp
589
588
579
577
POOR D
79 - 3500 - 3.5
1430 UT

NELC LA POSTA
2.0 CM
Np
NO DATA
E
WEATHER
W
Sp
---- UT
Ant. Temp. Unit 100°K


NELC LA POSTA
8.6 MM
Np
NO DATA
E
WEATHER
W
Sp
---- UT
Ant. Temp. Unit 100°K

REGIONS OF SOLAR ACTIVITY

DECEMBER 1976

MCMATH REGION 14543 CMP DATE 1.2

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	11	29	14543	S43 E20	43	100	1.0									

MCMATH REGION 14547 CMP DATE 1.6

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	11	30	14547	N33 E13	39	100	1.5									

MCMATH REGION 14542 CMP DATE 1.7

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	11	29	14542	N21 E26	37	200	1.5									

MCMATH REGION 14545 CMP DATE 3.6

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	11	29	14545	S44 E51	12	100	1.0									
76	11	30	14545	S44 E40	12	100	1.0									

MCMATH REGION 14552 CMP DATE 4.1

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	7	14552	N18 W46	5	200	1.5									

MCMATH REGION 14546 CMP DATE 4.9

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	11	29	14546	N07 E70	354	200	1.5									
76	11	30	14546	N07 E57	356	200	1.0									

MCMATH REGION 14549 CMP DATE 8.5

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	3	14549	N30 E68	303	100	2.0									
76	12	4	14549	N34 E54	304	300	1.5									
76	12	6	14549	N34 E26	306	400	1.5									
76	12	7	14549	N33 E12	307	400	1.5									
76	12	8	14549	N33 W01	306	300	1.5									

MCMATH REGION 14550 CMP DATE 9.5 RETURN OF REGION 14518 ROTATION 2

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	3	14550	N24 E77	294	800	1.5									
76	12	4	14550	N25 E65	293	900	1.5									
76	12	6	14550	N25 E39	293	900	1.5									
76	12	7	14550	N25 E26	293	1000	2.0									
76	12	8	14550	N25 E11	294	1000	2.5	19735	N23 E04	298	(AP)	3	B	20	1	AXX
76	12	11	14550	N26 W30	297	500	2.0									
76	12	12	14550	N25 W42	295	400	1.5									
76	12	13	14550	N25 W55	295	500	1.5									
76	12	14	14550	N25 W69	295	500	1.0									

REGIONS OF SOLAR ACTIVITY

DECEMBER 1976

MCMATH REGION 14553 CMP DATE 11.5

CALCIUM PLAGE DATA / SJNSPOT DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	7	14553	N07 E56	263	300	3.0	19734	N06 E52	266	(BP)	3	B	10	1	AXX
76	12	8	14553	N07 E41	264	700	3.0	19734	N06 E36	266	(B)	4	B	70	5	CSO
76	12	9							N07 E26				R	90	13	CSI
76	12	10						19734	N06 E12	267	(BP)	4	B	100	18	CAI
76	12	11	14553	N07 W01	268	1000	3.0	19734	N05 W02	268	(BP)	5	B	260	15	CSI
76	12	12	14553	N07 W13	266	1200	3.0	19734	N05 W15	267	(BP)	5	B	220	15	CSI
76	12	13	14553	N07 W26	266	1200	3.5	19734	N05 W29	267	(BP)	5	B	140	6	CSI
76	12	14	14553	N07 W40	266	1400	3.5	19734	N05 W42	268	(BP)	5	B	130	10	CSI
76	12	15	14553	N07 W54	267	1400	4.5	19734	N05 W57	270	(BP)	5	B	140	5	CAI
76	12	16	14553	N05 W68	268	1300	3.0	19734	N06 W68	268	(AP)	3	B	120	1	HSX
76	12	17	14553	N06 W83	269	1000	3.0	19734	N05 W81	267	AP	3	B	120	1	HSX

MCMATH REGION 14551 CMP DATE 11.8 RETURN OF R=GION 14530 ROTATION 2

CALCIUM PLAGE DATA / SJNSPOT DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	6	14551	N30 E73	259	1200	2.5									
76	12	7	14551	N28 E60	259	1200	2.5									
76	12	8	14551	N29 E46	259	1200	2.5									
76	12	11	14551	N29 E02	265	1200	2.5	19736	N27 E04	262	(B)	3				
76	12	12	14551	N28 W10	263	800	2.5									
76	12	13	14551	N28 W22	262	800	2.0									
76	12	14	14551	N28 W35	261	1000	2.0									
76	12	15	14551	N28 W47	260	1000	1.5									
76	12	16	14551	N29 W60	260	700	1.5									
76	12	17	14551	N28 W75	261	400	1.0									
76	12	18	14551	N29 W83	257	400	1.0									

MCMATH REGION 14554 CMP DATE 11.8

CALCIUM PLAGE DATA / SJNSPOT DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	6	14554	S25 E68	264	200	1.0									
76	12	7	14554	S26 E55	264	200	1.0									
76	12	8	14554	S25 E42	263	200	1.0									
76	12	11	14554	S27 E03	264	200	1.5									

MCMATH REGION 14556 CMP DATE 12.6

CALCIUM PLAGE DATA / SJNSPOT DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	11	14556	N19 E13	254	200	1.0									

MCMATH REGION 14568 CMP DATE 13.4

CALCIUM PLAGE DATA / SUNSPOT DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	18	14568	S05 W69	243	300	2.0									

MCMATH REGION 14565 CMP DATE 13.7

CALCIUM PLAGE DATA / SJNSPOT DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	15	14565	S06 W26	239	100	2.0									

MCMATH REGION 14557 CMP DATE 14.0

CALCIUM PLAGE DATA / SJNSPOT DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	11	14557	S10 E32	235	200	2.0									

REGIONS OF SOLAR ACTIVITY

DECEMBER 1976

MCMATH REGION 14558 CMP DATE 14.1

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	11	14558	S26 E32	235	100	1.0									
76	12	12	14558	S26 E19	234	100	1.5									
76	12	13	14558	S26 E07	233	300	2.5	19737	S27 E02	236	(AF)	2	B	0	1	AXX
76	12	14	14558	S26 W07	233	1000	3.0	19737	S28 W08	234	(BY)	4	B	30	18	BXI
76	12	15	14558	S27 W19	232	1000	3.5	19737	S27 W23	236	(B)	4	B	90	19	DAI
76	12	16	14558	S27 W33	233	900	4.0	19737	S27 W36	236	(BP)	3	B	40	5	DSI
76	12	17	14558	S27 W47	233	1200	3.5	19737	S26 W46	232	(B)	2	B	10	5	BXI
76	12	18	14558	S27 W59	233	1200	3.5	19737	S25 W61	233	(AF)	3	B	20	2	BXO
76	12	19	14558	S27 W72	233	900	3.0	19737	S27 W77	237	(AF)	2	B	10	1	AXX
76	12	20							S28 W84				R	10	1	AXX

MCMATH REGION 14559 CMP DATE 15.5

			CALCIUM PLAGE DATA					SJNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	11	14559	N07 E52	215	200	1.0									

MCMATH REGION 14563 CMP DATE 15.8

			CALCIUM PLAGE DATA					SJNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	13	14563	N18 E28	212	100	2.0									
76	12	14	14563	N18 E15	211	100	2.0									

MCMATH REGION 14561 CMP DATE 16.2

			CALCIUM PLAGE DATA					SJNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	13	14561	S22 E34	206	100	1.5									

MCMATH REGION 14567 CMP DATE 17.2

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	17	14567	N48 W06	192	200	1.0									

MCMATH REGION 14560 CMP DATE 17.3

			CALCIUM PLAGE DATA					SJNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	11	14560	S30 E73	194	300	2.0									
76	12	12	14560	S30 E61	192	300	2.0									
76	12	13	14560	S30 E48	192	100	1.5									
76	12	14	14560	S30 E35	191	100	1.0									

MCMATH REGION 14569 CMP DATE 18.0

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	21	14569	S05 W48	183	200	1.5									

MCMATH REGION 14575 CMP DATE 18.0

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	22	14575	N12 W61	182	100	1.5									

REGIONS OF SOLAR ACTIVITY

DECEMBER 1976

MCMATH REGION 14566 CMP DATE 20.7

CALCIUM PLAGE DATA / SUNSPOT DATA

YR	MO	DA	MC NO.	LAT	CMD	L	AREA	INT	MW NO.	LAT	CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	15	14566	S24	E67	146	300	2.0	19739	S26	E66	147	(AF)	2	B	10	1	AXX
76	12	16	14566	S24	E54	146	500	2.5		S27	E53				B	10	1	AXX
76	12	17	14566	S25	E40	146	500	3.5	19739	S27	E38	148	(AF)	2	B	10	4	BXI
76	12	18	14566	S25	E27	147	500	3.0										
76	12	19	14566	S25	E14	147	500	3.0										
76	12	21	14566	S25	W12	147	500	3.0										
76	12	22	14566	S26	W25	146	500	2.5										
76	12	23	14566	S26	W41	145	500	2.0										
76	12	24	14566	S26	W53	147	400	1.0										
76	12	25	14566	S27	W68	148	200	1.0										
76	12	26	14566	S27	W79	147	200	1.0										

MCMATH REGION 14564 CMP DATE 20.8 RETURN OF REGION 14528 ROTATION 2

CALCIUM PLAGE DATA / SJNSPOT DATA

YR	MO	DA	MC NO.	LAT	CMD	L	AREA	INT	MW NO.	LAT	CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	14	14564	N13	E85	141	800	1.5	19738	N11	E79	147	(AP)	4	B	100	1	HSX
76	12	15	14564	N13	E70	143	1000	2.0	19738	N11	E66	147	(AP)	5	B	140	1	HSX
76	12	16	14564	N13	E56	144	900	2.5	19738	N12	E53	147	(AP)	4	B	120	1	HSX
76	12	17	14564	N12	E41	145	900	2.5	19738	N12	E38	148	(AP)	5	B	130	1	HSX
76	12	18	14564	N12	E29	145	900	2.5	19738	N12	E25	147	(AF)	5	B	130	1	HSX
76	12	19	14564	N12	E16	145	900	2.5	19738	N12	E13	147	(AP)	5	B	160	1	HSX
76	12	20							19738	N12	W02	149	(AP)	5	R	110	1	HSX
76	12	21	14564	N12	W10	145	1000	3.5	19738	N12	W14	148	(AP)	6	B	130	4	CSX
76	12	22	14564	N10	W25	146	1000	3.0	19738	N12	W27	147	(AP)	6	B	110	1	HSX
76	12	23	14564	N10	W42	146	900	3.0	19738	N12	W43	148	(AP)	5	B	110	1	HSX
76	12	24	14564	N10	W53	147	1000	2.5	19738	N12	W54	148	(AP)	5	R	100	1	HSX
76	12	25	14564	N11	W68	148	800	1.5	19738	N11	W69	149	(AP)	4	B	40	1	HSX
76	12	26	14564	N11	W81	149	300	1.0		N10	W80				R	80	1	HSX

MCMATH REGION 14572 CMP DATE 22.7

CALCIUM PLAGE DATA / SJNSPOT DATA

YR	MO	DA	MC NO.	LAT	CMD	L	AREA	INT	MW NO.	LAT	CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	21	14572	S04	E14	121	300	1.5										
76	12	22	14572	S04	E01	120	200	1.0										
76	12	23	14572	S05	W16	120	200	1.0										

MCMATH REGION 14584 CMP DATE 22.7

CALCIUM PLAGE DATA / SUNSPOT DATA

YR	MO	DA	MC NO.	LAT	CMD	L	AREA	INT	MW NO.	LAT	CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	26	14584	N34	W52	120	100	2.0										

MCMATH REGION 14578 CMP DATE 22.8

CALCIUM PLAGE DATA / SUNSPOT DATA

YR	MO	DA	MC NO.	LAT	CMD	L	AREA	INT	MW NO.	LAT	CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	24	14578	S12	W24	118	100	1.0										

MCMATH REGION 14580 CMP DATE 24.4

CALCIUM PLAGE DATA / SUNSPOT DATA

YR	MO	DA	MC NO.	LAT	CMD	L	AREA	INT	MW NO.	LAT	CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	25	14580	N48	W17	97	100	1.5										
76	12	26	14580	N48	W28	96	100	1.5										

MCMATH REGION 14573 CMP DATE 25.7

CALCIUM PLAGE DATA / SUNSPOT DATA

YR	MO	DA	MC NO.	LAT	CMD	L	AREA	INT	MW NO.	LAT	CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	21	14573	N28	E54	81	100	1.5										

REGIONS OF SOLAR ACTIVITY

DECEMBER 1976

MCMATH REGION 14587 CMP DATE 26.3

CALCIUM PLAGE DATA — SUNSPOT DATA

YR	MO	DA	MC NO.	LAT	CMD	L	AREA	INT	MW NO.	LAT	CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	29	14587	S04	W43	72	100	1.0										

MCMATH REGION 14576 CMP DATE 28.4

CALCIUM PLAGE DATA — SJNSPOT DATA

YR	MO	DA	MC NO.	LAT	CMD	L	AREA	INT	MW NO.	LAT	CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	23	14576	N24	E60	44	200	1.5										

MCMATH REGION 14590 CMP DATE 29.3

CALCIUM PLAGE DATA — SUNSPOT DATA

YR	MO	DA	MC NO.	LAT	CMD	L	AREA	INT	MW NO.	LAT	CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	1	01	14590	N29	W43		200	1.5										
77	1	02	14590	N29	W57		100	1.5										

MCMATH REGION 14577 CMP DATE 29.8

CALCIUM PLAGE DATA — SUNSPOT DATA

YR	MO	DA	MC NO.	LAT	CMD	L	AREA	INT	MW NO.	LAT	CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	23	14577	S17	E78	26	900	2.0										
76	12	24	14577	S19	E65	29	800	1.5										
76	12	25	14577	S19	E50	30	600	2.0										
76	12	26	14577	S20	E39	29	500	1.5										
76	12	28	14577	S20	E13	26	500	1.0										
76	12	29	14577	S20	E00	29	400	1.5										
76	12	30	14577	S20	W14	29	500	1.5										
76	12	31	14577	S20	W27	30	500	1.0										
77	1	01	14577	S20	W40		400	1.0										
77	1	02	14577	S20	W56		400	1.0										

MCMATH REGION 14591 CMP DATE 30.2

CALCIUM PLAGE DATA — SJNSPOT DATA

YR	MO	DA	MC NO.	LAT	CMD	L	AREA	INT	MW NO.	LAT	CMD	L	MAG.	H	STA	AREA	CNT	CLASS
77	1	01	14591	N33	W31		300	3.5		N32	W37				B	10	4	B
77	1	02	14591	N33	W45		500	3.5		N33	W49				B	90	11	D
77	1	03	14591					0.0		N32	W60		(B)	5	B	120	5	C
77	1	04	14591	N32	W72		700	3.5	19742	N32	W72		(B)	3	B	160	8	D
77	1	05	14591	N33	W85		600	2.5		N31	W90				B	40	2	H

MCMATH REGION 14579 CMP DATE 30.9

CALCIUM PLAGE DATA — SJNSPOT DATA

YR	MO	DA	MC NO.	LAT	CMD	L	AREA	INT	MW NO.	LAT	CMD	L	MAG.	H	STA	AREA	CNT	CLASS
76	12	24	14579	S20	E80	14	1200	3.5	19740	S20	E80	14	(B	4	R	130	3	DAO
76	12	25	14579	S20	E70	10	2000	3.5	19740	S20	E62	18	(B)	4	B	70	5	DXO
76	12	26	14579	S20	E57	11	2200	4.0		S18	E57				R	140	11	EAO
76	12	27							19740	S20	E42	11	(BP)	5	B	90	9	CSI
76	12	28	14579	S20	E26	11	2800	4.0	19740	S20	E28	13	(BP)	5	B	90	7	CAO
76	12	29	14579	S20	E18	11	3000	4.0	19740	S20	E12	15	BP	5	R	100	7	CAO
76	12	30	14579	S20	E04	11	3000	3.5										
76	12	31	14579	S20	W08	11	3500	3.5										
77	1	01	14579	S20	W21		3200	3.5	19740	S20	W31		(BP)	5	B	100	11	C
77	1	02	14579	S20	W36		3000	3.0		S19	W47				B	70	2	H
77	1	03	14579					0.0		S20	W59		(AP)	4	B	100	1	H
77	1	04	14579	S20	W62		2700	3.0	19740	S20	W72		(AP)	4	B	60	1	H
77	1	05	14579	S20	W76		2000	3.0		S20	W87				B	50	1	H

Note: No calcium spectroheliograms were secured at the McMath-Hulbert Observatory on December 1, 5, 9, 10, 20 and 27, 1976. No sunspot observations were made at Mt. Wilson on December 9, 26, 30 and 31, 1976.

DAILY CALCIUM PLAGE INDEX

DECEMBER 1976

YR	MO	DAY	INDEX	YR	MO	DAY	INDEX	YR	MO	DAY	INDEX
76	12	1	*	76	12	11	7.5	76	12	21	5.4
76	12	2	0.4	76	12	12	6.0	76	12	22	3.9
76	12	3	0.3	76	12	13	6.4	76	12	23	3.2
76	12	4	0.7	76	12	14	8.2	76	12	24	2.7
76	12	5	*	76	12	15	8.4	76	12	25	3.3
76	12	6	2.1	76	12	16	6.3	76	12	26	5.1
76	12	7	4.2	76	12	17	5.8	76	12	27	*
76	12	8	6.1	76	12	18	5.2	76	12	28	9.7
76	12	9	*	76	12	19	4.1	76	12	29	11.3
76	12	10	*	76	12	20	*	76	12	30	10.7
								76	12	31	12.1

* NO OBSERVATIONS

SUDDEN IONOSPHERIC DISTURBANCES

DECEMBER 1976

DAY	UNIVERSAL TIME START	END	MAX	IMP	WIDE SPREAD INDEX	NUMBER OF STATION REPORTS BY TYPE SWF	SCNA	SEA	SPA	LF-SPA	SES	SFD	KNOWN FLARE	McMATH REGION
14	2234	2312	2243	1-	5				1	1	2		2232	14553
15	1500	1518	1504	1-	1	1							1456	14553
23	2003	2030	2005	1-	3	1		1	1	1	5		1953	X-RAY
26	1558	1615	1604	1-	1	1							*	
31	1815	1830	1819	1-	3	1					2		1812	14577

PERIODS OF NO OBSERVATIONS:

DATE	TIME (UT) and STATION
01	0000-2400 A41, 0720-0833 Um (10 kHz)
03	0308-0545 UM (10 kHz), 0642-0825 UM (10 kHz), 1905-2005 UM (10 kHz)
04	2107-2213 UM (10 kHz), 2245-2352 UM (10 kHz)
05	1911-2015 UM (10 kHz)
06	1700-2200 MC, 1908-2036 UM (10 kHz)
07	0000-2400 TN, 0338-0824 UM (10 kHz), 1841-2010 TM, 2015-2110 UM (13 kHz)
08-31	0000-2400 A41
08	0206-0244 TM, 0516-0615 UM (13 kHz), 0809-0935 UM (10 kHz)
09	0000-2400 A40, 1915-2015 UM (10 kHz)
10	0000-2400 A40, 1514-2400 MC
11	0000-0148 MC
12	2230-2346 TM
15	1727-2400 MC

DATE	TIME (UT) and STATION
16	0000-1821 MC, 1755-1913 UM (13 kHz), 2152-2214 TM
17	1700-1917 MC
18	0100-0800 UM (13 kHz)
19-24	0000-2400 A26
20	1918-2400 TM
21-23	0000-2400 A30
21	0000-0200 TM, 1430-2155 TM
22-30	0000-2400 A29
22-31	0000-2400 A40
23	0323-0421 UM (13 kHz), 0430-1610 MC, 2038-2110 UM (13 kHz)
24	2016-2054 UM (13 kHz)
25	0240-0740 UM (13 kHz)
27	0729-0800 UM (13 kHz)
29-31	2115-2400 A35

STATIONS REPORTING FOR DECEMBER 1976

AAVSO (A1., A19, A21, A29, A30, A31, A34, A35, A37, A40, A41) (SES) (A1, A26, A31) (SEA) (A31) (SWF)
HAWAII (HA) (SFD)
HERSTMONCEUX (HC) (SEA)
HIRAISO (HI) (SWF)
HOBART (TA) (SEA)
HUANCAYO (HU) (SWF)
INUBO (IN) (SPA)
MCMATH (MC) (SWF, SCNA)
PANSKA VES (PU) (SWF, SEA, SES)
SAO PAULO (UM) (SEA, SES)
SOFIA (SF) (SES)
ST CLOUD (SC) (SES)
TABLE MOUNTAIN (TM) (SPA, LF-SPA)
TORINO (TN) (SPA)
UPICE (UI) (SEA)

SID's BY McMATH REGION

DECEMBER 1976

DAY	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
REGION																															
53														1	1																
77																															1
X-RAY																							1								
UNKNOWN																															
NO FP																										1					

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

DECEMBER 1976

DEC 1976	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
01	0713	1512	DURN										
	1159	2106	SGMR										
	1348	2340	HARV										
	2203	0911	MANI										
02	0713	1511	DURN										
	1200	2106	SGMR										
	1348	2340	HARV										
	2204	0911	MANI										
03	0714	1511	DURN										
	1201	2106	SGMR										
	1351	2340	HARV										
	2204	0911	MANI										
04	0714	0835	DURN										
	1202	2105	SGMR										
	1344	2340	HARV										
	2205	0911	MANI										
05	0815	0835	DURN										
	1203	2105	SGMR										
	1400	2335	HARV										
	2205	0911	MANI										
06	0717	1510	DURN										
	1204	2105	SGMR										
	1400	2340	HARV										
	2205	0911	MANI										
07	0718	1510	DURN										
	1205	2105	SGMR										
	1417	2340	HARV										
	2205	0911	MANI										
08	0720	1510	DURN	0845.1	0845.2	3	0845.1	0845.2	3				IIIG
			DURN				1154.2	1154.4	2				IIIG
	1206	2105	SGMR										
			DURN	1234.4	1234.6	3	1234.4	1234.6	3				IIIG
			DURN	1235.6	1235.9	1	1235.6	1235.9	1				IIIG
	1400	2340	HARV										
	2207	0911	MANI										
09	0720	1510	DURN				1122.7	1122.7	1				III
	1207	2105	SGMR										
	1301	1400	DWIN				1301	1400	1				IS
	1400	2340	HARV										
	2208	0911	MANI										
10	0722	1510	DURN	0837.7	0837.7	2							III
	1207	2105	SGMR										
	1400	2340	HARV				2119		1	2119		1	IIIG
	2209	0911	MANI										
11	0453	0912	MANI										
	0722	1508	DURN	0945	1005	1	0945	1005	1				I,N
	1208	2105	SGMR										
	1400	2340	HARV				2128	2130	2	2128	2130	2	UNCL
12	0025	0350	MANI										
	0420	0912	MANI										
	0724	1508	DURN	0754.1	0754.1	1							III,RS
	1209	2105	SGMR										
	1400	2340	HARV										
	2211	0008	MANI										
13	0725	1508	DURN	0901.9	1250	1	0902	1250	1				I,DC,N
	1210	2105	SGMR										
	1700	2340	HARV										
	2211	0913	MANI										

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

DECEMBER 1976

DEC 1976	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
14	0725	1508	DURN	0827.6	0829.0	3	0827.7	0829.0	3				IIIGG
	0755	1445	WEIS				0827.6	0829.1	1				IIIG,U
			DURN	0900	1508 E	1	0900	1508 E	1				IC,DC,N
			WEIS				0938.6	0938.7	2				IIIG
			WEIS				1003.5	1003.7	2				IIIG
			WEIS				1007.7	1007.9					IIIGG,RS
			DURN	1021.0	1024.2	3	1021.0	1024.2	3				IIIGG,DCIM
	1211	2106	SGMR										
	1400	2340	HARV										
	2211	0915	MANI										
15	0727	1508	DURN	0727 D	0743	1	0727 D	0743	1				IC,DC,N
	0849	1444	WEIS				0926.9	0927.2	2				IIIG
			WEIS				0934.6	0934.8	2				IIIG
			DURN	0934.6	0934.7	1	0934.6	0934.7	1				IIIG
			WEIS				1056.4	1056.7	2				IIIG
			WEIS				1057.7	1057.8	1				IIIB
			WEIS				1059.3	1059.8	1				IIIG
			WEIS				1135.7	1135.8	1				IIIG
			WEIS				1142.4	1142.7	1				IIIG
	1211	2106	SGMR										
			DURN				1220.9	1220.9					IIIW
			DURN	1501	1508 E	1	1501	1508 E	1				I,N
	1415	2340	HARV				1620		1	1620		1	IIIG
			HARV				1823		2	1823		2	IIIB
			HARV				2159		2	2159		2	IIIB
			HARV				2209		2	2209		2	IIIB
	2211	0915	MANI										
16	0728	1508	DURN										
	0750	1406	WEIS										
	1212	2106	SGMR										
	1415	2340	HARV										
	2212	0918	MANI										
17	0729	0841	DURN										
	0958	1445	WEIS				1005.9	1014.7	3				IIIGG
			WEIS				1024.1	1024.2	1				IIIB
			WEIS				1041.5	1041.8	2				IIIG
	1053	1508	DURN										
	1239	2106	SGMR										
	1415	2340	HARV				1741	1742	1	1741	1742	1	IIIG
			HARV				2035		3	2035		3	IIIG
	2213	0919	MANI										
18	0730	0942	DURN										
	0751	1445	WEIS				0755.8	0756.7	1				IIIGG
			WEIS				0812.5	0812.8	1				IIIB
			WEIS				0822.3	0822.6	2				IIIG
			WEIS				0830.5	0830.6	1				IIIB
			WEIS				0856.1	0856.2	1				IIIB
			WEIS				1010.7	1011.4	1				IIIGG
	1213	2107	SGMR										
			WEIS				1358.3	1358.5	1				IIIB
	0954	1508	DURN	1503.5	1508 E	2	1503.5	1508 E	2				I,N
	1415	2340	HARV				1619		1	1619		1	IIIB
			HARV				1825		1	1825		1	IIIB
	2213	0919	MANI										
19	0730	1508	DURN	1025.5	1508 E		1025.5	1508 E					IC,N,W
			DURN	1109.4	1109.6	3	1109.4	1109.6	3				IIIG
	0852	1446	WEIS				1109.4	1110.1	2				IIIG
			WEIS				1148.5	1149.4	1				IIIG
			WEIS				1330.4	1330.6	1				IIIG
			WEIS				1408.8	1409.9	2				IIIG
	1214	2107	SGMR							1409.0	1409.8	1	V
			DURN	1454.3	1454.3	3	1454.3	1454.8	3				IIIG
			SGMR							1454.5	1455.0	1	III
	1415	2340	HARV				1454	1455	2	1454	1455	2	IIIG
			HARV							1521		1	IIIB

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

JANUARY 1977

JAN 1977	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
19			HARV				1542		2	1542		2	IIIG
			HARV				1607	1608	1	1607	1608	1	IIIG
			HARV				1627	1646	2	1627	1646	2	IIIGG
			HARV				1658		1	1658		1	IIIB
			HARV				1734	2032	2	1734	2032	2	IIIN
			HARV				2054	2055	3	2054	2055	3	IIIG
			HARV				2116		1	2116		1	IIIG
			HARV				2123	2124	3	2123	2124	3	IIIG
	2213	0919	MANI										
20	0732	1508	DURN	0732 D	1508 E		0732 D	1508 E					I,DC,W,N
	0753	0921	WEIS				0803.1	0803.2	2				IIIB
			WEIS				0825.7	0826.3	2				IIIG
			WEIS				0842.9	0843.0	2				IIIB
			WEIS				0852.6	0852.6	1				IIIB
			WEIS				1101.9	1102.2	1				IIIG
	0944	1445	WEIS				1108.2	1108.4	1				IIIG
			WEIS				1209.3	1209.4	1				IIIG
			WEIS				1355.3	1356.3					IIIG
			WEIS				1356.4	1358.5	2				IIIG
	1415	2340	HARV				1657		1	1657		1	IIIB
			HARV				1756	1758	1	1756	1758	1	IIIG
	1215	2108	SGMR							1808.8	1809.3	2	V
			HARV				1809	1810	3	1809	1810	3	IIIGG
			HARV				1846	1939	1	1846	1939	1	IIIN
			HARV				2021	2022	3	2021	2022	3	IIIG
	2213	0918	MANI										
21	0732	1508	DURN	0812	0827	1	0812	0827	1				I,N
	0756	1447	WEIS				0915.7	0915.9	2				IIIB
			WEIS				1311.3	1311.4	1				IIIB
	1215	2108	SGMR							1521.4	1521.7	1	III
	1415	2340	HARV				1923		1	1923		1	IIIB
			HARV				1938	1939	2	1938	1939	2	IIIG
			HARV				2116		1	2116		1	IIIB
	2213	0922	MANI										
22	0732	1508	DURN										
	0810	1210	DWIN				0936.4		1				IIIB
			DWIN				0939.9	0940.1	1				IIIG
	1216	2109	SGMR										
	1315	1420	DWIN										
	0754	1447	WEIS				1333.2	1333.3	1				IIIB
	1415	2345	HARV				1857	1900	3	1857	1900	3	IIIGG
			HARV				1940		2	1940		2	IIIG
			HARV				2042		1	2042		1	IIIB
	2214	0922	MANI										
23	0732	1508	DURN										
	0755	0911	WEIS										
	0935	1448	WEIS										
	1216	2109	SGMR										
	0843	1452	DWIN				1230	1345	1				IN
			DWIN				1345	1435	1				IS
	1415	2345	HARV				1813		3	1813		3	IIIG
	2215	0922	MANI										
24	0730	1509	DURN										
	0755	1447	WEIS										
	1216	2110	SGMR							1939.6	1940.2	1	IIIG
	1415	2345	HARV				1939	1940	3	1939	1940	3	IIIG,V
			HARV				1943	1947	1	1943	1947	1	IIIG
	2215	0922	MANI										
25	2215	0923	MANI							0107.8	0108.1		III,II
	0813	1510	DURN										
	1217	2110	SGMR										
	0755	1449	WEIS				1309.9	1310.2	1				IIIG
			WEIS				1339.2	1339.6	2				IIIGG
			WEIS				1344.9	1346.3	2				IIIGG

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

DECEMBER 1976

DEC 1976	TIMES OF OBSERVATION START UT	END UT	STATION	EVENTS DECIMETRIC BAND START UT	END UT	INT	METRIC BAND START UT	END UT	INT	DEKAMETRIC BAND START UT	END UT	INT	SPECTRAL TYPE
25	1415	2345	HARV				1832		1	1832		1	IIIG
26	0705	0825	WEIS										
	0730	1511	DURN										
	1155	1449	WEIS										
	1217	2111	SGMR										
	1415	2345	HARV				1922		1	1922		1	IIIG
			HARV				2009		2	2009		2	IIIB
	2216	0923	MANI										
27	0730	1511	DURN	0741.4	0742.2	3	0741.4	0742.2	3				IIIG
	2217	0923	MANI							0741.7	0742.4		III
			DURN	0746.2	0746.7	1	0746.2	0746.7	1				IIIG
	0755	1449	WEIS				0905.0	0905.2	1				IIIG
			WEIS				0910.8	0911.1	1				IIIG
			WEIS				1025.8	1029.4	1				IIIGG
			DURN	1026.2	1026.5	2	1026.2	1026.5	2				IIIG
			DURN	1028.7	1028.9	2	1028.7	1028.9	2				IIIG
			WEIS				1139.8	1140.1	1				IIIG
	1217	2112	SGMR										
	1415	2340	HARV				2015	2016	1	2015	2016	1	IIIG
			HARV				2101	2102	1				IIIG
28	0755	1450	WEIS										
	1218	2113	SGMR										
	1415	2340	HARV										
	0730	1512	DURN	1504.4	1505.1	3	1504.4	1505.1	3				IIIGG
	2218	0923	MANI										
29	0756	1452	WEIS				0943.4	0943.6	1				IIIB
			WEIS				1018.5	1018.7	1				IIIGG
	1129	1223	DWIN				1129	1223	1				IN
	1218	2113	SGMR										
	0730	1512	DURN	1236.8	1237.0	1	1236.8	1237.0	1				IIIG
			WEIS				1236.8	1239.7	2				IIIGG,RS
			DURN	1238.1	1238.4	3	1238.1	1238.4	3				IIIG
			DURN	1239.6	1239.7	3	1239.6	1239.7	2				IIIG
	1248	1430	DWIN				1248	1430	1				IS
			DWIN				1331.5	1333.5	2				IIIG
			WEIS				1331.5	1433.1	2				IIIGG
			DURN	1332.8	1332.9	1	1332.8	1332.9	1				IIIG
			DWIN				1334.9	1339.2	2				IIIGG
			WEIS				1335.8	1439.3	2				IIIGG
			DURN	1337.4	1337.5	1	1337.4	1337.5	1				IIIG
	1415	2340	HARV				1626	1627	1	1626	1627	1	IIIG
			HARV				1813		2	1813		2	IIIG
			HARV				1922	1923	3	1922	1923	3	IIIG
			HARV				1934	1936	3	1934	1936	3	IIIG,V
	2218	0923	MANI										
30	0730	1512	DURN										
			WEIS				0831.3	0831.4	1				IIIG
			WEIS				0834.3	0834.5	1				IIIG
	0850	1055	DWIN				0850	1055	1				IS
	0755	1035	WEIS				0926.0	0952.0					I
	1218	2114	SGMR										
	1320	1452	WEIS										
	1415	2345	HARV				1426	1700	1				IN
	2219	0923	MANI										
31	2219	0923	MANI							0140.9	0141.4		III,II
	0730	0814	DURN										
	0757	1353	WEIS				0900.9	1102.7	2				IIIG
	0823	1517	DURN				0901.2	0901.6	3				IIIG
			WEIS				0908.5	0908.8	1				IIIG
			WEIS				1000.7	1000.8	1				IIIG
			WEIS				1152.2	1153.3	2				IIIGG
			WEIS				1337.3	1337.4	1				IIIB
			WEIS				1416.2	1416.3	1				IIIB
	1415	2345	HARV				1606	1610	3	1606	1610	3	IIIGG

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

JANUARY 1977

JAN 1977	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
31			HARV				1737		3				UNCL
	1218	2115	SGMR							1802.1	1803.9	1	V
			HARV				1802	1804	3	1802	1804	3	IIIG,V,U
			HARV				1814	1817	3	1814	1817	3	IIIGG,V
			SGMR							1815.0	1816.3	1	III

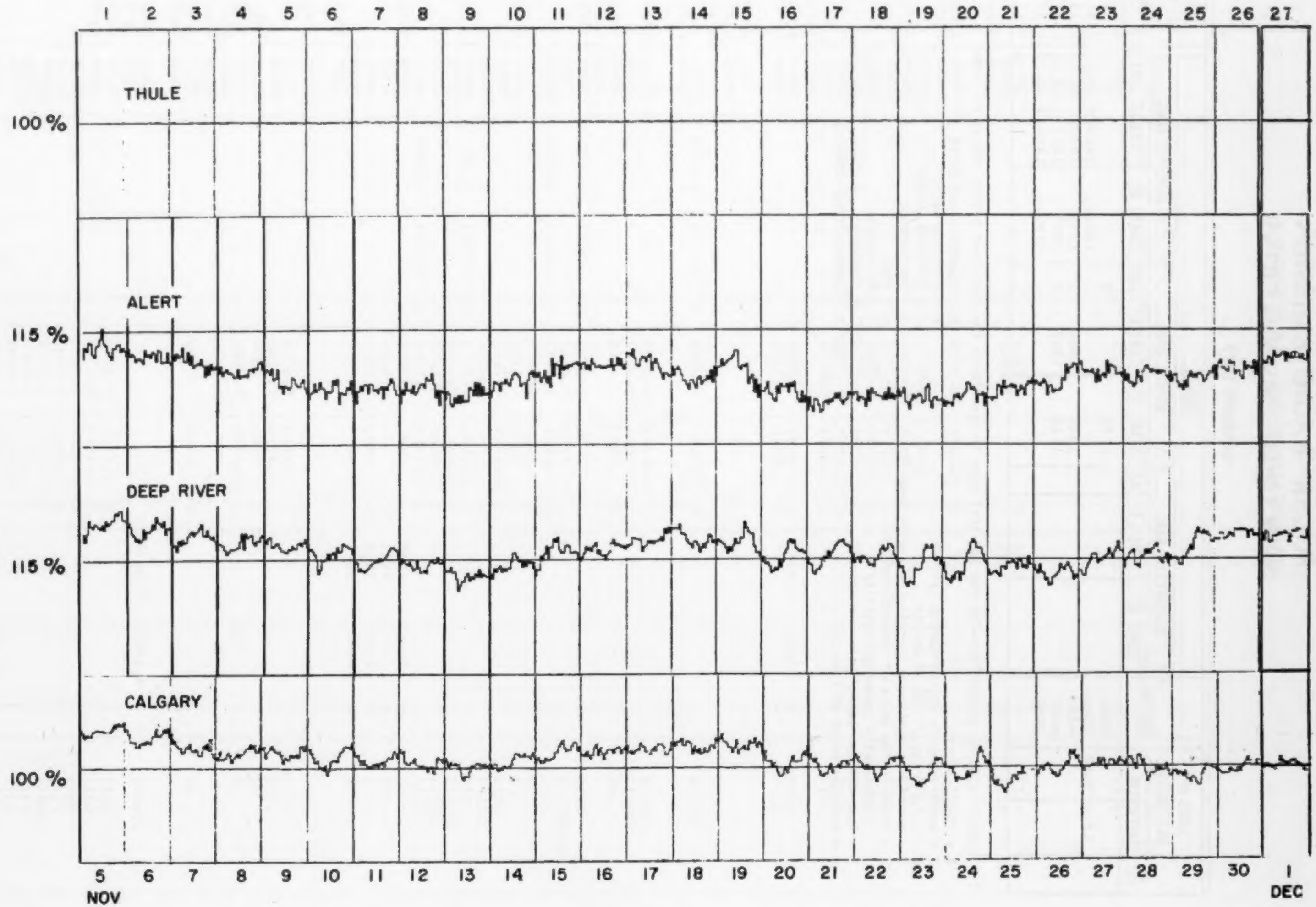
The symbols used in connection with the spectral type in describing the important bursts are as follows:

B = Single burst
G = Small group (< 10) of bursts
GG = Large group (> 10) of bursts
C = Underlying continuum (particularly with type I)
S = Storm in the sense of intermittent but apparently connected activity
N = Intermittent activity in this period
U = U-shaped burst of Type III

RS = Reverse slope burst
DP = Drifting pairs
DC = Drifting Chains
H = Herringbone
W = Weak
P = Pulsations
CONT = Continuum
UNCLF = Unclassified activity

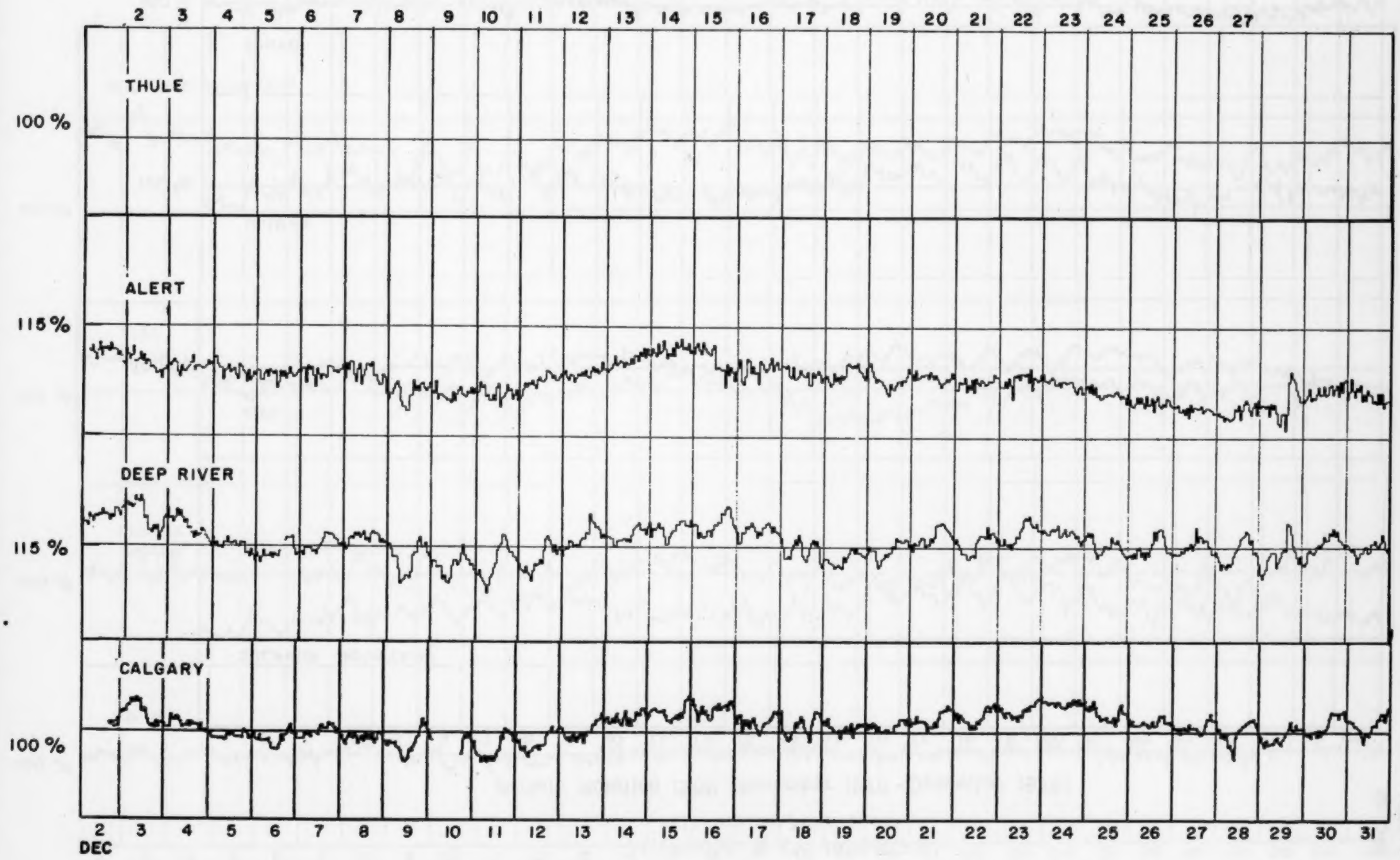
COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1959 (November 1976-December 1976)



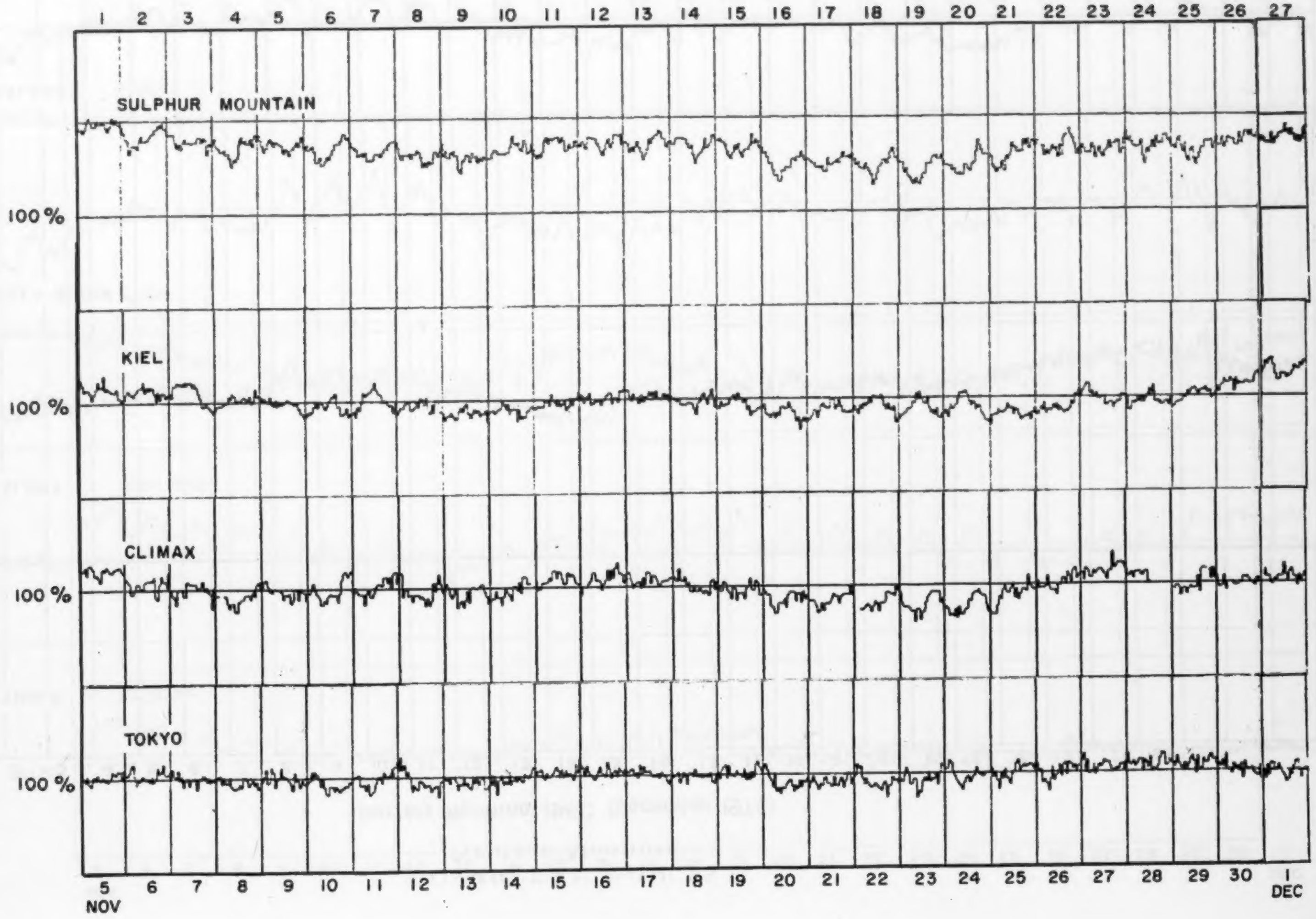
COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1960 (December 1976)



COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1959 (November 1976 - December 1976)



COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1960 (December 1976)

COSMIC RAY INDICES
(Neutron Monitors)
DECEMBER 1976

Dec. 1976	THULE Average cts/hr	ALERT Average cts/hr	DEEP RIVER Average cts/hr	CALGARY Average cts/hr	SULPHUR MT Average cts/hr	KIEL Average cts/hr	CLIMAX Average cts/hr	TOKYO Average cts/hr
1	Data not available at time of publication	7596.1	7134.3	11716.4(21)	9122.6	6468.3	4291.0	3670.4
2		7600.9	7159.4	11753.9(11)	9155.2	6494.9	4282.5	3668.9
3		7566.4	7160.1	11824.3	9188.6	6480.3	4298.7	3670.6
4		7557.1	7130.0	11748.8	9138.0	6449.4	4288.1	3671.7
5		7542.5	7074.8	11677.8	9090.1	6391.1	4269.8	3665.6
6		7530.9	7061.8(22)	11657.6	9072.3	6392.2	4274.3(6)	3669.4
7		7539.2	7081.5	11707.0	9099.8	6399.4	4277.0	3675.0
8		7535.6	7099.5	11672.5	9083.8(23)	6411.4	4297.4	3682.2
9		7478.3	7042.2	11634.0	9016.5	6355.1	4280.8	3666.9
10		7473.6	7022.9	11672.4(9)	9015.8	6345.3	4278.2	3663.0
11		7476.3	7031.4	11604.2	9010.4	6350.7	4263.6	3659.8
12		7512.8	7041.6	11642.6	9030.1	6350.5	4261.3	3660.3
13		7538.2	7101.8	11711.5	9086.1	6375.4	4278.7	3666.0(23)
14		7578.3	7108.1	11797.8	9126.4	6398.5	4292.8	3671.5
15		7611.9	7127.4	11834.3	9144.2	6418.7	4313.2	3672.8
16		7578.4	7137.9	11863.4	9151.4	6407.5	4300.0	3673.7
17		7554.3	7122.1	11775.3	9102.8	6378.5	4280.5	3680.9
18		7537.2	7068.7	11750.5	9058.5	6317.0	4276.0	3678.8
19		7539.6	7044.8	11735.5	9045.4	6279.7	4262.7	3668.2
20		7519.3	7069.0	11746.1	9066.0	6284.5	4260.7	3669.3
21		7529.0	7107.1	11792.9	9071.0	6317.5	4267.2	3671.3
22		7513.3	7086.9	11807.7	9092.2	6351.1	4289.7	3671.8
23		7521.6	7117.0	11851.0	9130.1	6367.5	4287.8	3676.4
24		7510.4	7116.7	11897.5	9152.3	6402.3	4305.9	3676.0
25		7480.3	7082.5	11828.1	9090.2	6387.7	4289.7	3667.1
26		7453.8	7077.2	11769.2	9046.1	6371.8	4248.5	3667.7
27		7433.2	7079.3	11743.2	9008.3	6362.4	4254.0	3666.4
28		7427.1	7064.6	11714.0	9008.9	6359.1	4234.7	3659.8
29		7450.7	7055.7	11683.9	8997.7	6362.9	4277.4	3681.8
30		7489.2	7084.0	11756.6	9054.4	6371.7	4300.3	3682.7
31		7476.5	7075.5	11756.7	9052.9	6369.5	4287.1	3678.2
MEAN		7521.0	7090.1	11745.9	9080.8	6379.7	4280.0	3671.1

( ) Number of hours for which data are available if less than 24. Number of Section Hours at Climax if sum of both sections is less than 40 hours.

Thule, Alert, Calgary, Sulphur Mountain, Kiel and Climax Scaling Factors = 100.
Deep River Scaling Factor = 300.
Tokyo Scaling Factor = 128.

Due to the closing of the Geopole Station the Thule neutron monitor operations were temporarily suspended at the end of May 1976. Operations have been resumed but data are still not available for publication.

GEOMAGNETIC ACTIVITY INDICES

DECEMBER 1976

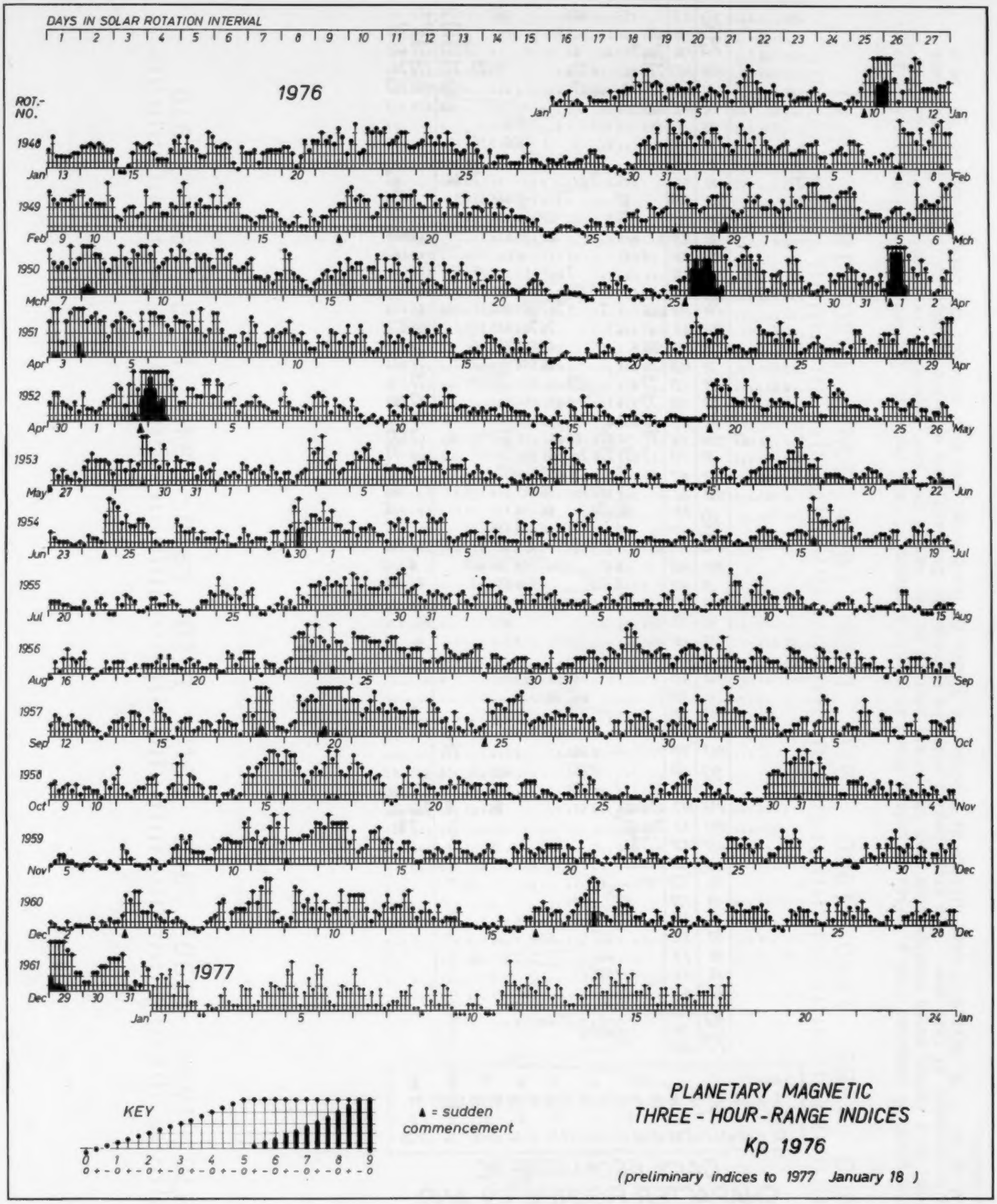
Day		Three-Hourly Indices Kp									Three-Hourly Indices Km								Ap	aa					Cp
		1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8		N	S	M			
1		2-	0+	1+	1+	2+	2-	2+	3-	14-	1+	0+	1+	1+	2+	2+	2+	3-	7	12	16	8	20	K	0.3
2	Q2	1	1-	0+	0+	1	0+	1-	1-	5	1+	0+	0+	0+	1+	1-	1	1	3	4	9	6	7	CK	0.1
3	Q4	1-	1-	1+	0+	1	1-	1+	1	7	1-	1-	1	1-	1+	1-	2-	1+	4	6	11	7	10	C	0.1
4		1	2-	4-	3+	4	4	2	2	22-	1	1+	4-	3	4+	4-	2	2-	15	26	38	31	34		0.8
5	Q0	3-	2-	1+	1	2	1	1+	1	12	2+	1	1+	1+	3-	1+	1+	1-	6	9	12	10	11	C	0.3
6	Q3	1-	0+	0+	0	0+	1	1+	2-	6-	1-	1-	0+	0+	1	1+	2-	2	3	8	7	4	11	CC	0.1
7		3	3+	0+	2	2+	2+	2+	3	19-	2+	2+	0+	2	3-	3-	2+	3+	10	18	25	16	27		0.6
8	D3	4	3	4+	5	5	2	1	1+	26-	4-	2+	3+	4+	5-	2+	1+	2-	23	25	39	42	22		1.1
9	D4*	1-	1+	4+	4	3-	3+	2+	4-	22+	1-	2-	4-	3+	2+	3+	3	3+	16	23	34	25	32		0.9
10		2+	3	2-	2+	2+	4	2	4-	21+	2-	2+	2-	4-	3-	4-	2-	3	13	25	23	17	32		0.7
11		4-	4-	4-	2+	1	2	2-	3-	21-	3	3+	3	3-	1+	2+	2-	2+	13	25	24	32	17		0.7
12	D5*	4-	2+	3-	3-	4-	4	2+	1+	23-	3	2-	2	2+	3+	4-	2+	1+	15	26	26	19	34		0.8
13		2	3	2	1+	3-	1	1+	1+	15-	1+	2+	2-	2-	2+	1	2	1	8	12	15	15	13		0.4
14	Q5	1+	2+	1-	1-	1-	0+	0+	1-	7	1	1+	1-	1	1-	1-	0+	1	4	6	8	9	5	CC	0.1
15	Q1	0+	1-	0+	1+	0	0	0+	0	3	1-	1-	1-	1+	0+	0	0+	0+	2	4	6	7	3	CC	0.0
16		0+	1+	1+	2+	2+	3	2+	2-	15-	0+	1+	1	3-	3	3	3	2-	8	14	22	12	24	K	0.4
17		2	2	1-	1+	2	3-	3+	4-	18-	2-	1+	1+	1+	2+	3	3+	3+	10	16	25	13	29		0.6
18	D2	5-	6+	5-	2-	1+	1	2+	4	26	4-	5-	4	2	1+	1+	2+	4-	28	38	51	68	21		1.2
19		3-	3-	2+	1+	1+	2-	1-	1	14-	2+	2-	2-	1+	2-	2+	2-	1+	7	10	13	13	10	CK	0.4
20	Q7	2	1+	0+	1-	1+	2+	1	1	10	1+	1	1	1	2-	2	1+	1	5	9	13	10	13	CC	0.2
21	Q6	0+	1-	1+	1	1-	2	1+	1	8+	0+	1	1+	1+	1-	2+	1+	1	4	7	13	9	11	CK	0.1
22		0+	3-	2+	2	3-	2	2	2+	16+	1	2+	2	3-	3-	3-	2+	3-	8	13	21	16	19		0.4
23	Q8	2+	3-	2	1+	0	0+	0	1	10-	2+	2	2-	2-	0+	1-	0+	1+	5	10	10	15	5	CC	0.2
24		2	2-	2+	2	2	1	2-	1-	13+	2-	1+	2	2	3-	2	2-	1	6	13	13	14	13	CC	0.3
25		1-	3-	1	3-	3+	2-	2+	1+	16-	1+	2	1+	3-	4-	2	2+	2-	9	15	23	12	26		0.5
26		2+	3	2	1+	1	1-	1-	1+	12+	2-	2	2-	2-	2-	1	1	1+	6	10	13	14	9	C	0.3
27		2	0+	0+	1+	1+	2-	3	1+	11+	2-	1-	1	2-	1+	2+	3+	2	6	16	15	10	22	K	0.3
28	Q9	2-	2	1+	2-	1-	1-	2	2	12	1+	2-	2-	2-	1+	1+	3	2+	6	10	18	12	15	K	0.2
29	D1	6+	6-	6-	5+	4+	4	2+	2+	36	5+	5-	5	5+	4	4-	3-	3	45	48	93	107	35		1.5
30		1+	1+	2+	2+	3	3	4-	4-	21-	2	2	2+	3-	3	3	4-	4-	13	19	36	18	37		0.7
31		4-	4	2+	1-	1+	1	3+	3-	19	4-	3	2+	1+	1+	1+	3+	3-	12	25	18	23	20		0.7
																			10	16.2	22.4	19.3			0.48

Day	Three-Hourly Indices Kn								Three-Hourly Indices Ks							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
1	1+	0	1+	1+	2+	2+	2-	3-	2-	1-	1+	1+	2+	3-	2+	3-
2	1+	1-	0+	0+	1	1-	1-	1	1+	0+	0+	0+	1+	1	1	1+
3	0+	0+	1	0+	1+	1-	1+	1	1	1	1	1+	2-	1	2	2-
4	1	1+	3+	3	4+	4-	2	2-	1	2-	4+	3+	4+	4-	2	2
5	2+	1	1	1	2	1+	1+	1-	3-	1	2-	2-	3	2-	2-	1
6	0+	0+	0+	0	0+	1+	1+	2-	1-	1	1-	0+	1+	1	2	2+
7	2+	3-	0	2-	2+	2+	2	2+	3-	2-	1-	2+	3	3-	3-	4-
8	3+	2	4-	4+	5-	2	1-	1	4	3-	3+	4+	5	3-	2-	2+
9	1-	1+	4	4-	2+	3+	3	3+	1-	2-	3+	3+	3-	3	3	3
10	1+	2+	1+	4+	3-	4-	2-	3	2-	2	2-	2	3-	4-	2-	3+
11	3-	3	3+	3	1+	2	1+	2	3	3+	3-	2	1+	3-	2-	2+
12	3	2-	2+	3-	4-	4-	3-	1+	3-	2-	2-	2+	3	4-	2+	1+
13	1+	3-	2-	2-	3-	1-	2-	1-	1+	2	2-	2-	2+	1	3-	1+
14	1	2-	0+	1-	1-	1-	0	0+	1+	1+	1-	1+	1	1	1-	1+
15	0	0+	0+	2	0	0	0	0	1	1	1	1	1-	0+	0+	1
16	0	1-	1	2	3-	3	3-	1+	1-	2-	1+	3	3	3	3	2-
17	2-	1+	1-	1	2+	3-	3	3	2-	1+	2-	2-	2+	3	3+	4-
18	4-	5-	4	2-	1+	1+	2	3+	4-	5-	4	2	2-	1+	2+	4-
19	2	2-	2-	1+	2-	1+	0+	1+	3-	1+	1+	2-	2-	3-	3-	1+
20	1+	1	1-	1-	1+	2	1	1-	2-	1	1+	1+	2-	2	2-	1+
21	0	1-	2-	1	0+	2+	1+	1-	1-	1+	1	1+	1	2+	1+	1+
22	1-	2	2	3-	3-	2+	2	2	1+	3-	2	3-	3-	3-	3-	3+
23	2-	2	1+	2-	0+	0	0	1	3	2	2-	2-	1-	1+	0+	2-
24	2-	1+	2-	2-	2	2-	2-	1-	2-	1	2	2	3-	2	2-	1+
25	1	2	1+	3-	4-	2-	2+	1+	2-	2	2-	3-	4-	2+	3-	2-
26	1+	2+	1+	2-	2-	1-	1-	1	2-	2-	2-	2-	2-	1+	1+	1+
27	2-	0	1-	2-	1+	2+	3+	2-	2-	1+	1+	1+	2-	2+	3+	2
28	1	1+	2-	2	1	1	2+	2	2-	2-	1+	2-	1+	2-	3+	3
29	5+	4	5	5+	4	4	2	3-	6-	5	5	5+	4	3+	3	4-
30	1+	1+	2	3-	3	3	3+	3+	2+	2+	3-	3-	3	3	4-	4+
31	3+	3	2-	1+	1+	1	3	3-	4	3+	3-	2-	2-	2-	3+	3-

DAILY AVERAGE INDICES Ap

1976

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	4	23	17	107	10	6	18	8	10	14	10	7
2	4	20	32	16	58	6	9	8	24	21	7	3
3	15	16	27	44	94	12	12	10	10	9	6	4
4	10	12	12	30	20	20	14	5	14	6	4	15
5	9	8	15	27	14	20	6	6	9	13	3	6
6	13	8	33	30	8	7	6	5	7	11	2	3
7	11	21	26	27	10	13	9	5	10	6	3	10
8	5	29	42	14	10	8	13	4	7	6	6	23
9	4	24	36	16	4	4	10	12	6	6	8	16
10	47	24	32	12	6	6	6	9	5	6	18	13
11	40	12	27	12	11	26	4	5	4	8	23	13
12	13	17	26	9	7	7	5	3	8	14	24	15
13	9	22	11	13	6	4	4	3	5	8	31	8
14	11	17	14	15	4	3	6	4	10	7	16	4
15	7	8	15	4	5	4	19	2	10	33	9	2
16	10	6	18	8	5	5	16	6	6	29	5	8
17	14	14	20	5	4	14	5	5	10	30	7	10
18	9	22	13	2	3	21	6	4	33	19	5	28
19	8	25	11	5	12	4	6	6	20	7	9	7
20	11	19	8	2	19	5	4	5	51	7	7	5
21	20	14	5	5	11	3	3	8	24	7	4	4
22	23	14	3	19	11	3	4	5	17	5	5	8
23	20	4	5	8	14	4	5	30	12	6	4	5
24	21	3	4	16	6	16	4	25	7	6	3	6
25	10	4	4	9	9	18	9	24	24	5	11	9
26	5	9	138	6	6	7	4	18	13	4	9	6
27	6	26	35	11	5	6	8	13	12	7	8	6
28	5	20	15	10	14	5	16	10	5	5	2	6
29	6	34	15	17	22	5	18	6	10	3	6	45
30	9		12	10	17	29	19	6	9	16	11	13
31	29		10		9		7	5		34		12
MEAN	13	16	22	17	14	10	9	9	13	12	9	10



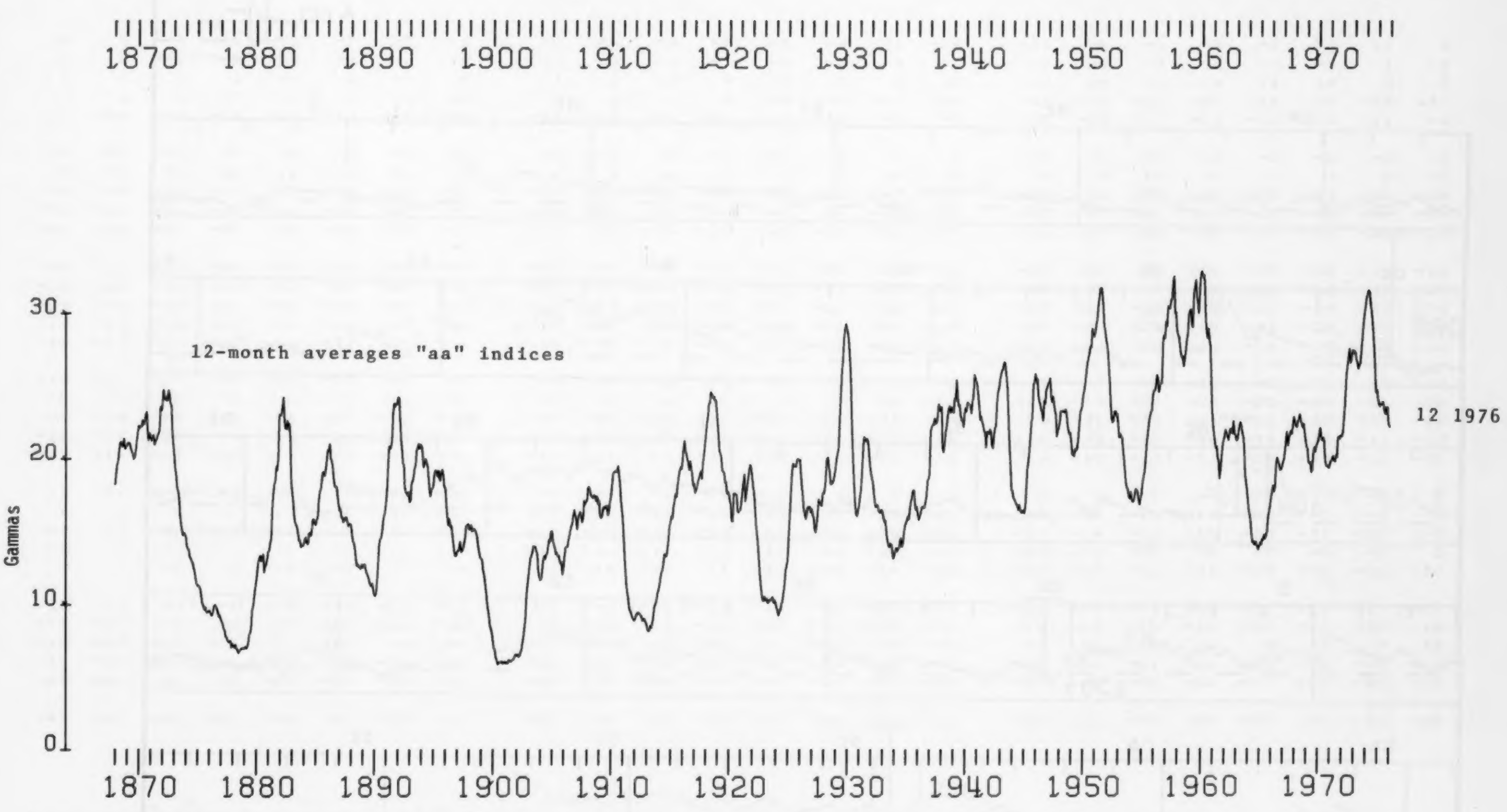
PLANETARY MAGNETIC
THREE-HOUR-RANGE INDICES
Kp 1976
(preliminary indices to 1977 January 18)

R9	Rot.-No.	1st day	C9	
455 422 442	19	J 1	2 . . 355 244 666 422 2 , . 365 , 35 556	654 .44
, , 2 346 423	73	J28	654 ,44 422 446 532 2 , , 236 332 777	766 755
333 346 532		F24	766 755 64 , ,62 232 24 , . . 3 , 57 777	777 665
334 565 432	1910	M23	777 665 446 876 2 , . , 2 , .5. 772 777	777 764
355 435 42 ,	11	A19	777 764 466 675 432 2 ,4 443 , , 2 576	665 567
344 42 , ,33	12	M16	665 557 54 . ,22 2 . . . . 5 453 2 . , 266	655 335
433 544 334	13	J12	655 335 665 , , 26 , , , 57 653 2 , . . . 3	2 , , ,22
3 , 2 2 , , ,22	14	J9	2 , , ,22 64 , ,32 , ,4 , 26 645 563 4 , 2	232 2 , ,
33 , . , , 235	15	A5	232 2 , , . ,32 . . , , 2 ,3 576 566 542	. , , 342
775 3 ,2 245	16	S1	, , , 342 227 632 2 .342 , .34 476 662	. . . ,67
553 2 , ,2 .2	17	S28	, , ,67 333 , ,2 534 42 , 665 556 5 ,2	, . . 576
453 2 . , , ,2	18	O25	. . . 576 5 .2 ,54 263 32 , .32 234 5 . ,	5 ,2 675
345 3 , , , ,2	19	N21	5 ,2 675 4 , , , , . ,64 32 , 522 , , , 2 . ,	.46 665
344 , , , ,34	1920	D18	.46 665 . . . ,35 444 234 43 . 2 ,4 , , ,	244 462
543 , , , , , ,	19	J14	244 462 44 , . ,7 665 555 432 222 3 , .	466 53 .
234 332 2 ,2		F10	466 53 . 23 . .35 476 666 655 5 25 534	666 424
232 222 ,22	74	M9	666 424 .72 . .5 767 665 556 554 466	565 446
245 643 222	1924	A5	565 446 5 . , , , . ,76 766 655 555 542	566 6 .4
666 42 , , ,2	25	M2	566 6 .4 33 . , , . 366 655 555 664 343	246 655
235 543 22 ,	26	M29	246 655 2 , , , ,2 466 556 442 352 222	277 654
,366 642 344	27	J25	277 654 232 678 464 545 353 22 , ,32	277 556
443 323 454	28	J22	277 556 532 , ,5 655 554 443 , , , . , ,	267 666
332 , ,2 345	29	A18	267 666 632 556 456 645 543 2 , , , ,4	277 .56
55 , ,24 467	1930	S14	277 .56 676 466 664 456 632 23 , 363	,47 677
642 , ,2 223	31	O11	.47 677 776 734 ,65 666 532 , , , . ,2	256 277
,2 , 233 2 , ,	32	N7	256 277 663 442 355 546 542 . . . ,44	2 , , 247
, ,2 333 3 ,2	1933	D4	2 , , 247 555 534 256 655 444 335 33 ,	42 . 266
222 322 22 ,	19	D31	42 . 266 676 2 , . . 66 456 533 ,23 3 , ,	,43 , 246
, ,2 22 , . . ,		J27	43 , 246 533 424 236 666 656 443 222	645 2 ,3
, . , , ,2 22 ,	75	F23	645 2 ,3 533 265 . .2 776 665 644 34 .	,34 246
. , . , , , . . .	1937	M22	,34 246 652 32 , ,22 466 766 665 2 , ,	. ,6 546
. , , 223 , , ,	38	A18	, ,6 546 422 , . . , ,4 546 654 45 . . ,4	.64 245
, , , , , , , , .	39	M15	.64 245 332 ,45 3 ,3 , .5 633 33 , . . .	464 234
, , , ,23 222	40	J11	464 234 333 ,2 , . . , , , , 653 , , , , ,3	664 5 ,2
233 322 223	41	J8	664 5 ,2 443 442 , , , , ,6 533 . , , 2 , ,	,62 ,44
665 322 , , ,	42	A4	,62 ,44 4 , . ,45 ,2 , .44 32 , 2 , , ,64	, , , . . .
222 ,2 , 22 .	43	A31	, , , . . . 3 , , 566 543 2 ,3 42 , , ... 4	42 , . , .
, , , , ,2 2 , ,	44	S27	42 , . , . 32 , 667 662 322 ,22 , . , , , ,	, . , ,23
, . . ,22 223	45	O24	. . , ,23 252 677 533 ,65 42 . . , , 4 ,2	257 244
2 , , ,22 . . ,	46	N20	257 244 4 ,2 666 633 2 , . 542 , . . ,24	2 , , .23
, . , , ... ,	1947	D17	2 , , .23 2 .5 664 43 , , .4 324 3 , . 774	23 , 342
22 , , , , . . .	19	J13	23 , 342 235 655 3 , , , ,2 665 432 256	663 455
. , , , , , , . ,		F9	663 455 2 ,4 565 44 . . .2 656 566 346	676 666
, ,2 262 332	76	M7	676 666 344 554 32 , . , , . ,9 443 284	766 664
2 , , 222 222	1951	A3	766 664 433 234 ,2 , . , , ,52 62 , 334	327 854
32 , ,22 2 , ,	52	A30	327 854 222 , ,32 , . , , . 35 334 ,2 ,	,45 42 ,
. . . . , , ,22	53	M27	,45 42 , ,35 523 2 . , 62 , . . . 45 . , . .	.45 2 , ,
2 , , , , , . . .	54	J23	.45 2 , , ,65 234 , ,2 43 , . , . ,54 , , ,	. . . , .2
. . . .22 222	55	J20	. . , , .2 .24 552 222 , , , , ,32 , . . , .	, , , , ,2
22 , , ,2 , ,2	56	A16	. , , , ,2 ,66 653 3 , , ,35 342 222 , , .	2 ,3 2 ,3
, , , , ,2 222	57	S12	2 ,3 2 ,3 657 543 ,53 3 ,3 245 2 ,4 3 , ,	, ,2 422
,23 223 2 , .	58	O9	, ,2 422 666 522 2 , , , , . 2 , .463 2 , ,	. . . , ,25
. . . ,2 , , , ,	59	N5	. . . ,25 566 42 , 2 ,2 2 , . , .3 22 . ,3 ,	. .4 , .3
. .2 232 ,22	60	D2	. .4 , .3 543 342 . .2 362 , .2 , ,2 , , ,	733
2	19	D29	733 5 ,2 353 3 ,2 .44 254 22	
		J25	preliminary	
	77	F21		

Symbol	.	,	2	3	4	5	6	7	8	9
$\bar{R}$ =	0	1-15	16-30	31-45	46-60	61-80	81-100	101-130	131-170	171...
R9,C9 =	0	1	2	3	4	5	6	7	8	9
Cp =	0.0-0.1	0.2-0.3	0.4-0.5	0.6-0.7	0.8-0.9	1.0-1.1	1.2-1.4	1.5-1.8	1.9	2.0-2.5

DAILY GEOMAGNETIC CHARACTER FIGURES C9 AND 3-DAY MEAN SUNSPOT NUMBERS R9

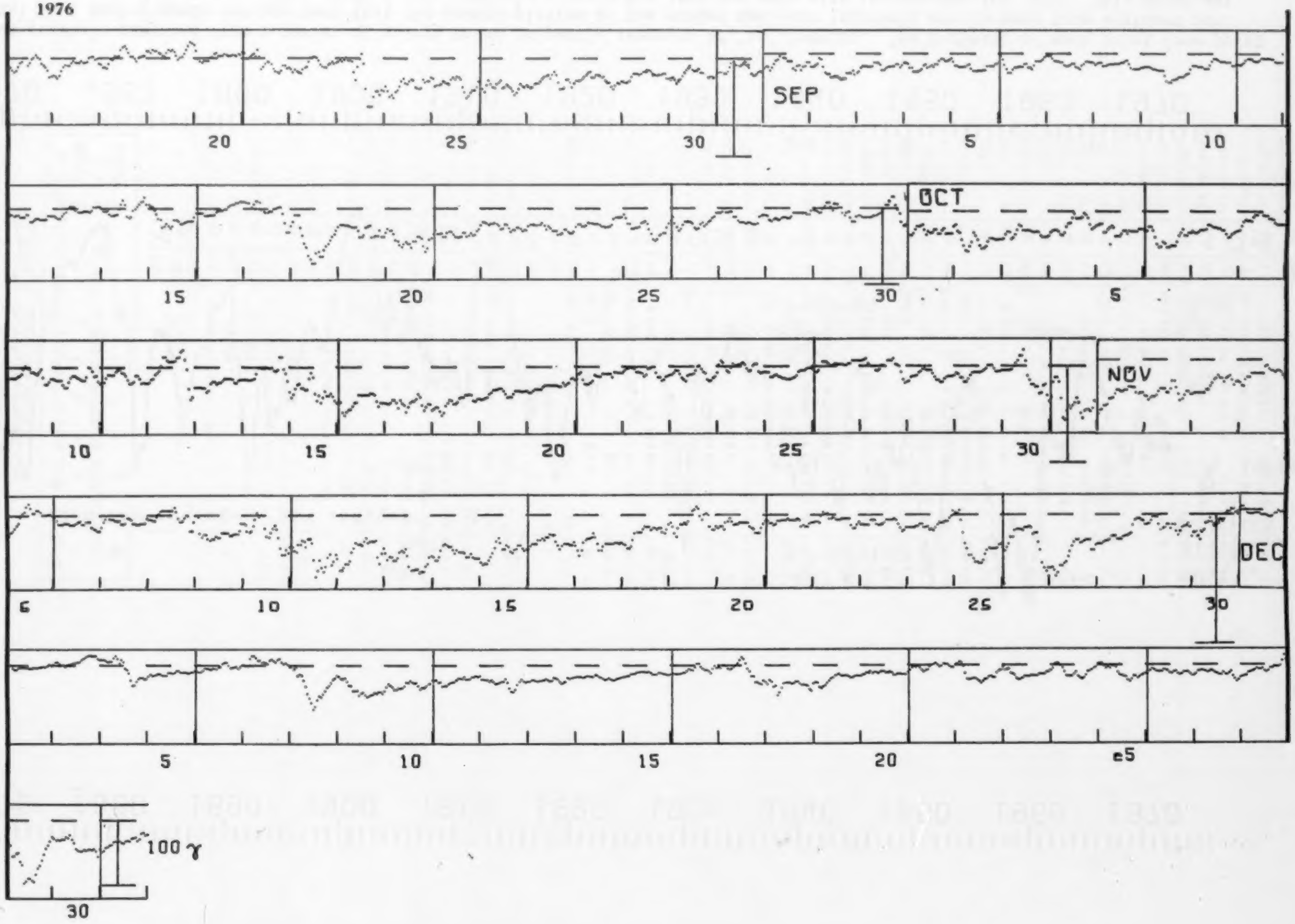
For explanation and previous years see J. Bartels, Abhandlungen der Akademie der Wissenschaften zu Göttingen, Beiträge zum I.G.J., Heft 3 (1958) (may be requested from Institut für Geophysik, Postfach 876, 34 Göttingen, Germany).



The above graph is computed from a series of points based on yearly averages of "aa" indices. The ordinate of each point (one point per month) is a twelve month average such that the points plotted at the marked ten year intervals are in each case averages for January to December of that year. The graph begins with the average for 1868 and ends with the average for 1976. This graph was provided by Dr. P. N. Mayaud of the Institut de Physique du Globe, Paris, France, who also provides the daily values of "aa" on a monthly basis.

GEOMAGNETIC ACTIVITY INDICES

Hourly Equatorial Dst



<u>Note</u> the sensitivity indicator for each month on the last day of the month and also note that the zero reference level is different for each month.

also note that the zero reference level is different for each month.

HOURLY EQUATORIAL DST VALUES (PROVISIONAL)

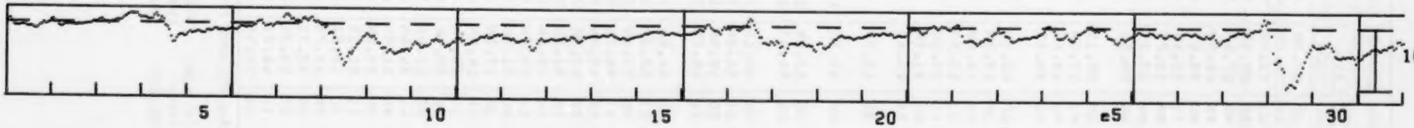
DECEMBER 1976

NASA/GODDARD SPACE FLIGHT CENTER

(Time-UT) (Units-Gammas)

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	5	5	0	-6	-7	-7	-7	-6	-6	-6	-8	-9	-8	-9	-11	-12	-10	-6	-5	-1	-4	-3	-1	3
2	4	0	-1	-6	-8	-8	-5	-4	-5	-4	-5	-5	-6	-5	-4	-5	-5	-3	-3	-2	-3	-1	1	-1
3	1	4	5	2	-1	0	-3	0	1	1	3	4	4	5	8	10	12	14	15	14	14	14	9	7
4	8	8	6	4	5	5	11	14	9	2	8	4	-6	-8	-13	-24	-32	-31	-25	-21	-19	-19	-22	-21
5	-17	-14	-17	-16	-15	-13	-14	-16	-17	-16	-12	-12	-13	-12	-9	-9	-12	-12	-11	-12	-13	-11	-11	-9
6	-10	-11	-11	-8	-5	-5	-6	-7	-3	-6	-6	-3	-2	2	4	4	-1	-5	-4	-3	-2	-6	-2	0
7	0	-1	-1	10	14	14	11	6	7	3	4	3	1	7	9	6	4	8	10	4	1	3	0	-3
8	-2	-7	-4	-17	-15	-16	-24	-33	-44	-51	-58	-68	-63	-53	-47	-49	-44	-39	-34	-31	-27	-22	-20	-16
9	-18	-21	-22	-20	-25	-31	-32	-40	-39	-39	-47	-43	-42	-46	-49	-48	-46	-45	-42	-44	-41	-41	-44	-39
10	-33	-29	-31	-34	-38	-38	-35	-36	-35	-32	-26	-27	-24	-26	-28	-27	-32	-37	-35	-35	-32	-29	-28	-23
11	-23	-23	-27	-26	-33	-32	-32	-29	-27	-26	-25	-23	-20	-20	-21	-18	-22	-22	-21	-18	-18	-16	-18	-16
12	-22	-22	-23	-23	-25	-23	-26	-29	-28	-27	-25	-25	-21	-27	-36	-41	-42	-37	-30	-25	-22	-25	-27	-25
13	-25	-23	-23	-24	-25	-24	-24	-23	-21	-23	-25	-24	-19	-20	-22	-26	-29	-27	-25	-19	-21	-19	-19	-18
14	-18	-18	-18	-19	-16	-16	-17	-18	-18	-15	-15	-18	-19	-21	-23	-22	-20	-22	-24	-23	-21	-20	-19	-18
15	-18	-17	-16	-13	-13	-13	-11	-11	-10	-10	-11	-11	-10	-12	-15	-14	-15	-12	-12	-13	-14	-15	-16	-14
16	-13	-13	-14	-14	-13	-12	-12	-9	-6	-7	-8	-3	2	2	-3	-6	-8	-8	-10	-13	-6	-1	-5	-3
17	-5	-1	0	-1	-6	-7	-5	-2	0	3	8	12	9	2	-6	-10	-18	-18	-27	-27	-29	-30	-24	-26
18	-30	-23	-26	-34	-32	-47	-42	-35	-28	-27	-27	-27	-29	-28	-25	-25	-29	-31	-30	-31	-32	-37	-40	-28
19	-26	-27	-34	-36	-33	-31	-27	-24	-20	-19	-16	-14	-13	-16	-17	-16	-16	-18	-20	-19	-17	-16	-17	-17
20	-15	-14	-12	-12	-10	-13	-11	-11	-13	-11	-9	-10	-12	-12	-10	-12	-16	-15	-13	-13	-15	-14	-14	-11
21	-7	-4	-2	-3	-1	-4	-8	-11	-9	-7	-2	0	1	3	0	-3	-1	2	1	1	-2	-4	-4	0
22	2	5	4	-2	-13	-22	-23	-22	-21	-21	-23	-25	-28	-25	-22	-21	-18	-17	-19	-19	-12	-9	-7	-3
23	-8	-7	-6	-13	-14	-16	-21	-23	-22	-20	-17	-18	-18	-16	-16	-16	-17	-14	-13	-14	-13	-11	-10	-8
24	-5	2	3	3	-1	-5	-11	-17	-18	-18	-17	-14	-11	-18	-20	-22	-20	-15	-10	-9	-7	-5	-3	2
25	2	3	-2	-6	-3	-6	-1	-1	-4	-12	-16	-17	-18	-19	-24	-26	-22	-17	-18	-21	-18	-16	-14	-13
26	-11	-9	-6	-7	-10	-11	-11	-11	-7	-6	-10	-13	-14	-11	-10	-14	-16	-14	-11	-11	-11	-14	-17	-17
27	-14	-10	-9	-8	-9	-10	-12	-10	-8	-11	-13	-14	-16	-16	-12	-15	-16	-13	-10	-18	-22	-26	-23	-19
28	-18	-17	-16	-12	-11	-10	-8	-6	-7	-7	-6	-10	-12	-9	-5	-5	-2	-3	-3	-1	6	15	7	12
29	11	-12	-39	-56	-55	-51	-50	-64	-69	-97	-94	-89	-90	-93	-95	-83	-73	-69	-61	-52	-43	-38	-32	-25
30	-28	-31	-30	-31	-29	-30	-25	-27	-22	-30	-35	-44	-47	-48	-48	-45	-47	-45	-45	-46	-44	-48	-56	-44
31	-49	-47	-42	-41	-38	-37	-33	-32	-31	-32	-35	-36	-32	-31	-32	-28	-27	-26	-32	-29	-20	-19	-24	-22

DEC



PRINCIPAL MAGNETIC STORMS

DECEMBER 1976

OBS. 2 letter IAGA code	GEOMAGNETIC LATITUDE	COMMENCEMENT DAY	COMMENCEMENT hr min (UT)	COMMENCEMENT TYPE	SC - AMPLITUDES D(')	SC - AMPLITUDES H(γ)	SC - AMPLITUDES Z(γ)	MAXIMUM 3 HOUR - INDEX K DAY (3 HOUR PERIOD)	K	RANGES D(')	RANGES H(γ)	RANGES Z(γ)	UT END DAY	UT END HOUR
JP	17.3N	4	0624	SC	- 0.1	8	- 1	--	-	3	94	11	04	18
SH	14.6N	4	0624	SC	- 0.1	8	2	--	-	2	81	11	04	18
UJ	13.5N	4	0623	SC	- 0.1	11	- 3	--	-	2	95	13	04	18
AL	09.5N	4	0624	SC	..	8	..	04(3,4,5)	4	3	102	15	04	18
HD	07.6N	4	0624	SC	- 0.1	+11	- 1	04(3)	5	3	110	14	05	15
AN	01.5N	4	0624	SC	- 0.5	20	5	--	-	2	106	41	06	24
HU	00.6S	4	0626	SC	1	11	2	04(5,6)	5	5	128	28	04	21
TV	01.1S	4	0624	SC*	0.3	23	26	--	-	1	93	116	04	18
PM	18.7S	4	0619	SC	+ 0.5	+11	+ 9	04(3)	5	7	60	60	04	23
HR	33.7S	4	06--	..	..	..	..	04(3)	5	19	91	76	04	20
KG	56.5S	4	0624	SC	..	..	..	04(5)	4	--	--	--	04	18
NE	55.1N	7	11--	..	..	..	..	08(3,4) 09(3,4)	5	31	107	142	11	12
HD	07.6N	7	1100	..	..	..	..	08(4)	6	4	149	12	09	23
HU	00.6S	7	1050	..	..	..	..	08(5)	5	7	219	47	08	24
KG	56.5S	7	11--	..	..	..	..	08(5)	8	--	--	--	08	16
BD	48.9N	8	01--	..	..	..	..	08(4)	5	18	53	43	08	16
JP	17.3N	8	05--	..	..	..	..	--	-	3	120	23	08	16
SH	14.6N	8	05--	..	..	..	..	--	-	2	135	22	08	16
UJ	13.5N	8	05--	..	..	..	..	--	-	2	124	19	08	16
AL	09.5N	8	05--	..	..	..	..	08(5)	6	4	125	18	08	16
AN	01.5N	8	05--	..	..	..	..	--	-	3	155	41	08	16
TV	01.1S	8	05--	..	..	..	..	--	-	2	184	101	08	16
BD	48.9N	9	0608	SC*	+ 9	+41	+ 4	09(3)	5	19	60	33	11	12
HR	33.7S	12	00--	..	..	..	..	12(5)	5	16	68	59	12	19
HD	07.6N	16	1107	SC	+ 0.1	+10	- 1	18(2)	4	2	86	25	18	12
KG	56.5S	16	1106	SC	..	..	..	18(2)	5	--	--	--	18	10
NE	55.1N	17	13--	..	..	..	..	18(2)	6	28	121	77	18	08
WI	54.2N	17	17--	..	..	..	..	18(2)	6	25	120	30	18	07
BD	48.9N	17	23--	..	..	..	..	18(3)	5	13	55	20	18	08
TO	46.7S	17	14--	..	..	..	..	18(2)	6	16	120	60	18	12
CO	64.6N	28	2038	SC*	- 5	..	..	29(3)	7	265	1750	950	29	19
SI	60.0N	28	2039	SC	- 2.0	+ 6.8	+ 3.7	29(3)	7	--	--	660	29	17
NE	55.1N	28	2036	SC	1	18	..	29(3)	7	50	206	303	30	01
WI	54.2N	28	20--	..	..	..	..	29(1)	6	30	175	90	29	19
FR	49.6N	28	20--	..	..	..	..	29(1)	6	36	132	70	30	01
BD	48.9N	28	2036	SC	+ 1	+21	..	29(3)	7	36	152	89	29	20
IR	41.0N	28	2042	SC	20	18	- 4	28(1,3,4,6)	6	16	156	61	31	08
TU	40.4N	28	2039	SC	+ 0	+22	+ 1	29(1)	7	17	160	25	31	09
SJ	29.9N	28	2036	SC	+ 0.5	+14	+03	29(1)	6	10	115	34	31	04
HO	21.1N	28	2036	SC	- 0	+18	+04	29(1)	6	7	159	31	29	16
JP	17.3N	28	2037	SC	- 0.7	18	- 5	--	-	8	165	19	29	16
SH	14.6N	28	2037	SC	- 0.5	17	3	--	-	6	193	14	29	16
UJ	13.5N	28	2037	SC	- 0.5	22	- 6	--	-	6	166	18	29	16
AL	09.5N	28	2037	SC	- 0.6	18	- 6	29(2,3,4,6)	5	6	159	31	29	16
HD	07.6N	28	2036	SC	- 0.5	+21	- 2	29(4)	6	6	181	30	31	01
GU	04.0N	28	2037	SC	..	+19	-04	29(1)	5	10	200	40	31	03
AN	01.5N	28	2037	SC	- 1.1	25	12	--	-	6	199	97	29	16
HU	00.6S	28	2037	SC	2	53	5	29(1,2,5)	5	8	209	40	30	24
TV	01.1S	28	2037	SC	0.1	20	22	--	-	5	248	121	29	16
AP	16.0S	28	2037	SC	- 1	+17	- 5	09(4)	5	8	202	39	30	13
PM	18.7S	28	2036	SC	- 1	+25	+15	29(2,3,4)	5	12	190	80	31	08
HR	33.7S	28	2037	SC	+ 2	+23	+17	29(1,3,6)	5	18	176	85	31	01
GN	43.3S	28	2036	SC	+ 1	+24	+11	29(1,3,4)	6	23	100	170	30	02
TO	46.7S	28	2038	SC	- 1	+17	+ 4	29(1,2,4)	6	27	160	70	29	21
KG	56.5S	28	2037	SC	..	..	..	29(4)	7	--	--	--	29	21

Reports were received from the following observatories:

College, Sitka, Newport, Witteveen, Fredericksburg, Boulder, Tucson, San Juan, Honolulu, Jaipur, Shillong, Ujjain, Alibag, Hyderabad, Guam, Annamalaingar, Huancayo, Trivandrum, Port Moresby, Hermanus, Gnangara, Toolangi, Port-aux-Francais

SUDDEN COMMENCEMENTS AND SOLAR FLARE EFFECTS

DECEMBER 1976

PRELIMINARY REPORT ON RAPID MAGNETIC VARIATIONS (by Dr. A. Romana)
The meaning of the station symbols is given in the IAGA-Bulletin nr. 32.
Times of ssc are mean values.

Sudden commencements followed by a magnetic storm or a period of storminess (ssc)

04 0625 B: SO WN CI HU GN TO KG DU; C: WI NI EB TL KY LM CZ (si: A: SO HB; B: FU - pcl: WN)

16 1107 A: LG; B: GN KG DU; C: WN WI HU LM (si: A: SO; C: TL)

28 2037 A: LG HU LM; B: MT CI TL KA KY GN TO CZ; C: NI CF HB EB KG DU)

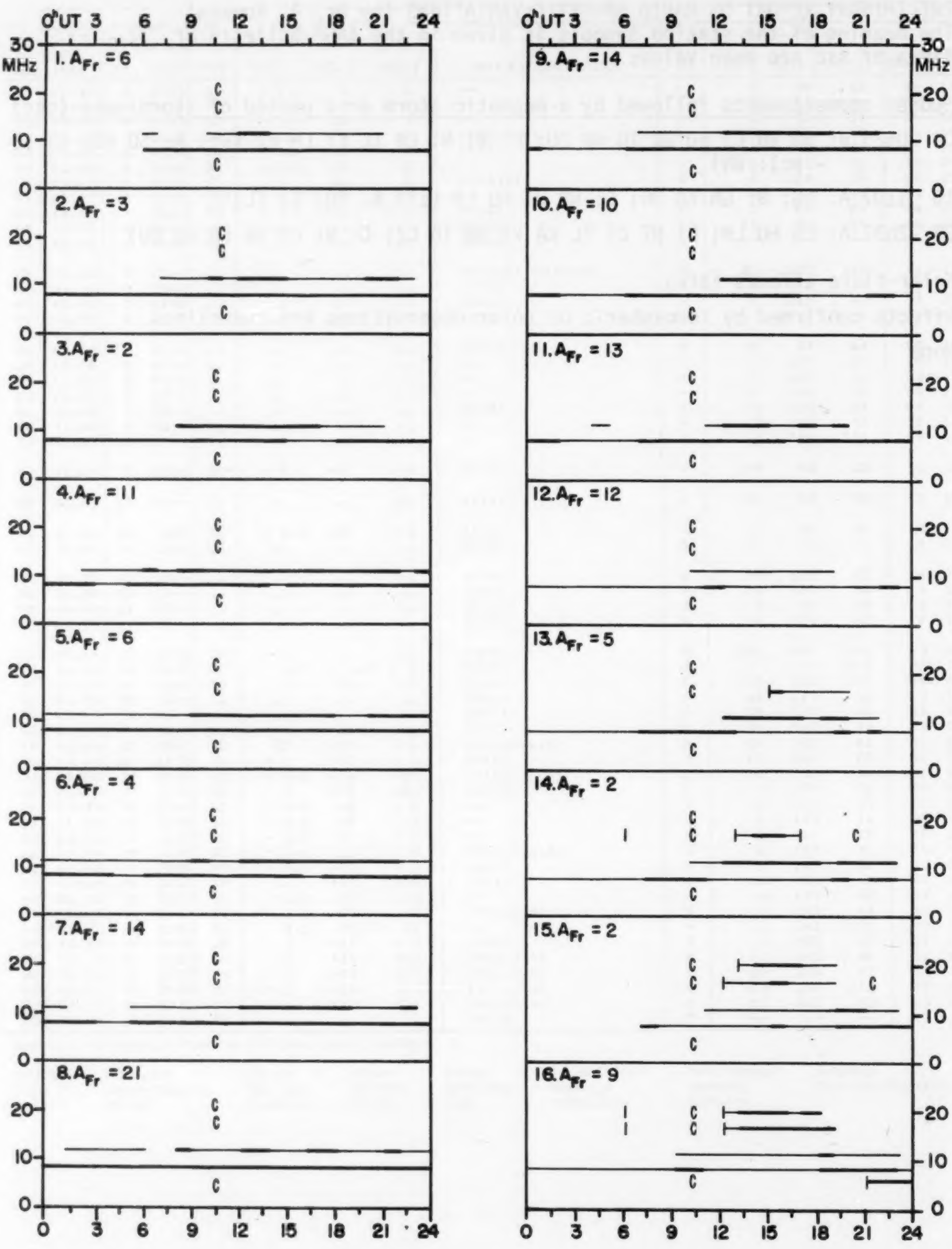
Solar-flare effects (sfe)

Effects confirmed by ionospheric or solar observations are underlined.

None

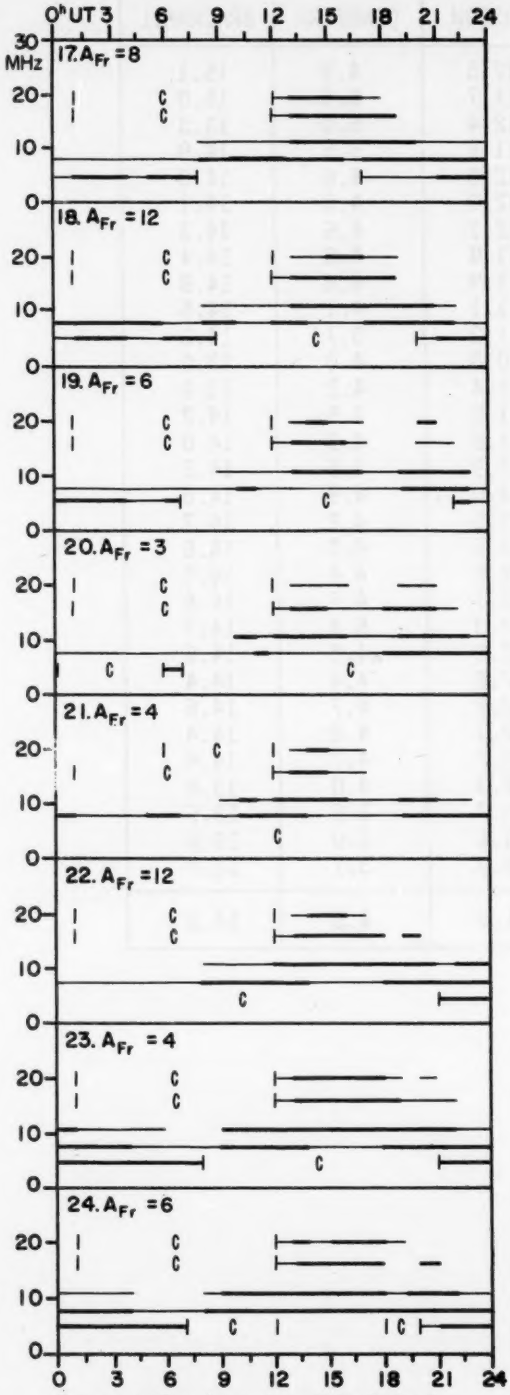
TRANSMISSION FREQUENCY RANGES -- NORTH ATLANTIC PATH

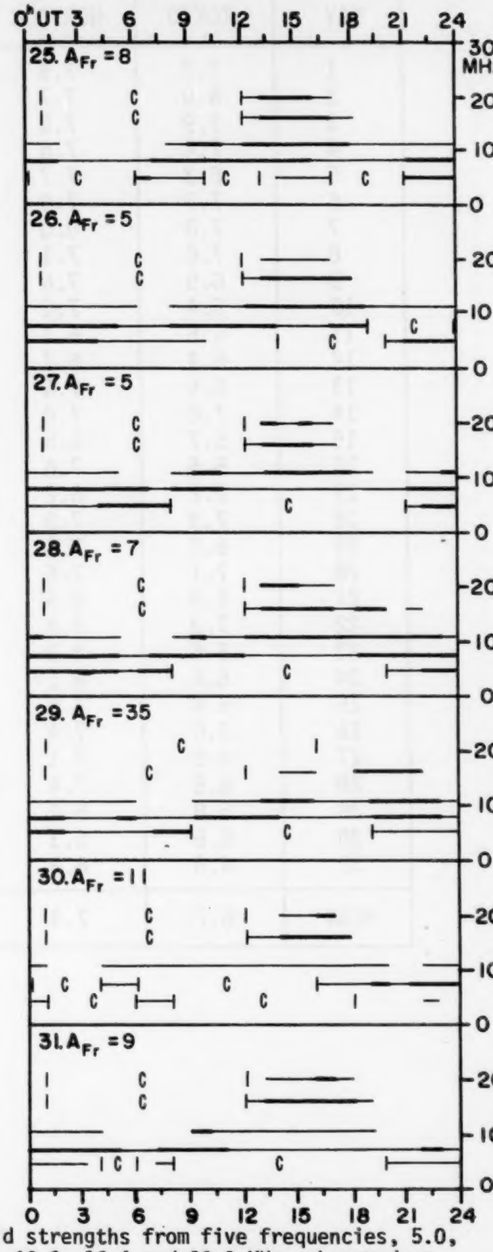
DECEMBER 1976



TRANSMISSION FREQUENCY RANGES – NORTH ATLANTIC PATH

DECEMBER 1976





C = no value because of technical trouble or interference.

Field strengths from five frequencies, 5.0, 8.1, 10.9, 16.4 and 20.0 MHz, observed on a Lüchow -Norfolk circuit are represented above. Heavy solid lines represent field strengths ≥-12 dB above 1 μv/m (transmitter power reduced to 1 kW). Observed field strengths between -12 dB above 1 μv/m and -40 dB above 1 μv/m are represented by the fine line. Adapted from Observations by Deutsche Bundespost

ESCOMM - ERL

RADIO PROPAGATION QUALITY INDICES

DECEMBER 1976

DAY	TOKYO	NORFOLK	MOSCOW	CANBERRA	BRACKNELL
1	7.7	7.9	12.5	4.9	15.1
2	6.9	7.7	11.7	5.5	15.0
3	7.9	7.0	12.4	5.0	14.3
4	7.4	7.6	11.8	5.5	14.9
5	6.3	7.7	12.0	5.6	14.0
6	7.7	7.0	12.0	4.6	14.1
7	7.0	8.0	12.1	4.6	14.3
8	7.6	7.1	11.9	4.5	14.4
9	6.9	7.6	11.9	4.4	14.8
10	5.4	7.0	11.1	4.1	14.5
11	5.6	6.7	11.2	3.7	14.0
12	6.4	6.7	10.8	4.0	13.0
13	6.5	7.4	11.4	4.2	13.9
14	7.0	7.6	11.8	4.5	14.2
15	5.7	6.5	11.6	4.2	14.0
16	5.5	7.6	11.9	4.9	14.2
17	7.2	8.2	12.0	4.9	14.8
18	7.3	7.9	12.5	4.2	14.7
19	6.9	7.4	12.5	4.3	14.6
20	7.1	7.6	12.2	4.4	14.5
21	6.9	6.9	12.1	4.2	14.6
22	7.3	7.8	12.3	5.1	14.7
23	6.6	8.3	12.0	4.0	14.5
24	6.6	8.1	12.6	4.4	14.4
25	6.8	7.5	12.2	4.7	14.6
26	6.0	7.4	12.1	4.0	14.4
27	6.0	7.1	11.2	4.7	14.4
28	6.8	7.4	12.3	4.0	13.9
29	5.8	6.4	10.7	3.6	13.5
30	6.6	6.3	10.6	4.0	13.8
31	4.8	6.8	9.9	3.7	13.9
MEAN	6.7	7.4	11.8	4.5	14.3

USCOMM-NOAA-ASHEVILLE--2-28-77--950

February 1977 Number 390-Part II

P-A STACKS

Solar-Geophysical Data comprehensive reports

Data for August 1976–July 1976 & Miscellanea

Explanation of Data Reports Issued as Number 378 (Supplement) February 1976

noaa NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION / ENVIRONMENTAL DATA SERVICE / ASHEVILLE, N.C.

U.S. DEPARTMENT OF COMMERCE
Juanita M. Kreps, Secretary
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
Robert M. White. Administrator
ENVIRONMENTAL DATA SERVICE
Thomas S. Austin, Director

Solar - Geophysical Data

NO. 390 FEBRUARY 1977

Part II (Comprehensive Reports)

DATA FOR
AUGUST 1976
JULY 1976
& MISCELLANEA

NATIONAL GEOPHYSICAL AND SOLAR - TERRESTRIAL DATA CENTER
BOULDER, COLORADO

For obtaining bulletins on a data exchange basis, send request to: World Data Center A for Solar-Terrestrial Physics, NOAA, Boulder, Colorado 80302.

For sale through the National Geophysical and Solar-Terrestrial Data Center, NOAA, Boulder, CO 80302. Subscription Price: $34.00 annually for both Part I (Prompt Reports) and Part II (Comprehensive Reports) or $18.00 annually for either part. Annual supplement containing explanation is included. For foreign mailing add $32.00 for both parts or $16.00 for either part. Single issue price $1.50 for either part and $1.40 for the extra issue. Make checks and money orders payable to: Department of Commerce, NOAA/NGSDC.

To standardize referencing these reports in the open literature, the following format is recommended:

Solar-Geophysical Data, 390 Part I (or Part II), pages, February 1977, U.S. Department of Commerce, (Boulder, Colorado, U.S.A. 80302).

SOLAR - GEOPHYSICAL DATA

No. 390

Issued in two parts

Hope I. Leighton, Editor

J. Virginia Lincoln, Director
Solar - Terrestrial Data Services Division

CONTENTS

Part I (Prompt Reports)

	Page
Index for 1976 and 1977	2
Data for January 1977	3-24
Data for December 1976	25-118

Part II (Comprehensive Reports)

Index for 1976 and 1977	2
Data for August 1976	3-27
Data for July 1976	29-39
Miscellaneous Data	41-44

Solar Radio Waves -
Selected Events by Radioheliograph
August - October 1976

INDEX FOR 1976 - 1977 DATA PUBLISHED IN "SOLAR-GEOPHYSICAL DATA"

		1976 Aug	Sep	Oct	Nov	Dec	1977 Jan
A.	Solar and Interplanetary Phenomena						
A.1	Sunspot Drawings	386A 22	387A 26	388A 26	389A 26	390A 28	
A.2a	Zürich Provisional Relative Sunspot Numbers R_Z	385A 7	386A 7	387A 7	388A 7	389A 7	390A 7
A.2b	Zürich Final Sunspot Numbers R_Z						
A.2c	American Relative Sunspot Numbers R_A'	385A 7	386A 7	387A 7	388A 7	389A 7	390A 7
A.3a	Mt. Wilson Magnetograms	386A 22	387A 26	388A 26	389A 26	390A 28	
A.3b	Mt. Wilson Magnetic Characteristics of Sunspots	386A 84	387A 86	388A 88	389A 86	390A 90	
A.3c	Kitt Peak Magnetograms	386A 22	387A 26	388A 26	389A 26	390A 28	
A.3d	Mean Solar Magnetic Field (Stanford)						390A 21
A.4	Hα Spectroheliograms	386A 22	387A 26	388A 26	389A 26	390A 28	
A.5	Calcium Plage Drawings - McMath (or Catania)	386A 22	387A 26	388A 26	389A 26	390A 28	
A.5a	Calcium Plage (McMath) and Sunspot Regions	386A 84	387A 86	388A 88	389A 86	390A 90	
A.5b	McMath Daily Calcium Plage Indices	386A 89	387A 93	388A 94	389A 90	390A 95	
A.6	Hα Synoptic Charts	386A 20	387A 26	388A 26	389A 26	390A 26	
A.6b	Synoptic Chart and Active Regions (Paris)	390B 4					
A.7f	Helium D3 Chromosphere (Big Bear)	385A 21	---	387A 20	388A 21	389A 21	390A 18
A.7g	Helium Synoptic Maps (KPNO)						390A 19
A.7h	Coronal Line Emission (Sac Peak)	386A 22	387A 26	388A 26	389A 26	390A 28	
A.8aa	2800 MHz - Daily Values of Solar Flux (ARO-Ottawa)	385A 7	386A 7	387A 7	388A 7	389A 7	390A 7
A.8ac	2800 MHz - Daily Values of Adj. Solar Flux (ARO-Ottawa)	385A 7	386A 7	387A 7	388A 7	389A 7	390A 7
A.8g	Daily Values of Adjusted Solar Flux (AFGL)	385A 7	386A 7	387A 7	388A 7	389A 7	390A 7
A.9cb	8.6 mm Radio Maps of the Sun (NELC - La Posta)	386A 22	387A 26	388A 26	389A 26	390A 28	
A.9d	2 cm Radio Maps of the Sun (NELC - La Posta)	386A 22	387A 26	388A 26	389A 26	390A 28	
A.10a	169 MHz - Interferometric Observations (Nancay)	---	386A 12	387A 12	388A 12	389A 12	390A 12
A.10c	21 cm East-West Solar Scans (Fleurs)	385A 14	387A101	388A101	388A 14	389A 14	
A.10d	43 cm East-West Solar Scans (Fleurs)	385A 15	387A102	388A102	388A 15	389A 15	
A.10e	10.7 cm East-West Solar Scans (Ottawa-ARO)	385A 13	386A 13	387A 13	388A 13	389A 13	390A 13
A.11g	Solar X-ray (SMS/GOES)	385A 18	386A 16	387A 18	388A 19	389A 18	390A 15
A.11h	Solar X-ray (OSO-8; 1975-057A)	386A 22	387A 26	388A 26	389A 26	390A 28	
A.11i	Solar X-ray (Columbia U.)						
A.12ba	Cosmic Ray Protons (Pioneers 6 & 7)	---	386A 15	387A 16	388A 18	---	---
A.12bb	Cosmic Ray Protons (Pioneers 8 & 9)	---	---	387A 17	---	---	---
A.12e	Energetic Solar Particles (IMP H & J)	390B 23					
A.13a	Solar Wind (Pioneers 6 & 7)	---	386A 15	387A 16	388A 18	---	---
A.13ab	Solar Wind (Pioneers 8 & 9)	---	---	387A 17	---	---	---
A.13d	Solar Wind from IPS Measurements			387A 15	388A 17	389A 17	390A 24
A.13e	Solar Plasma (IMP H & J)	390B 22					
A.17	Interplanetary Magnetic Field (Pioneer 8)	---	---	---	---	---	---
A.17	Interplanetary Magnetic Field (Pioneer 9)	---	---	387A 17	---	---	---
A.17c	Inferred IP Magnetic Field	385A 22	386A 18	387A 21	388A 22	389A 22	390A 20
A.18	Interplanetary Electric Field (Pioneer 8)	---	---	---	---	---	---
A.18	Interplanetary Electric Field (Pioneer 9)	---	---	387A 17	---	---	---
B.	Ionospheric (and Radio Wave Propagation) Phenomena						
B.52	Graphs of Transmission Frequency Range	386A112	387A116	388A116	389A110	390A116	
B.53	Quality Figures Based on Frequency Ranges	386A114	387A118	388A118	389A109	390A118	
C.	Flare-Associated Events						
C.1a	Optical Observations Flares	385A 10	386A 10	387A 10	388A 10	389A 10	390A 10
C.1ba	Optical Observations Flares (Standardized Data)	390B 6					
C.1d	Flare Patrol Observations	385A 11	386A 11	387A 11	388A 11	389A 11	390A 11
C.1d	Flare Patrol Observations	390B 11					
C.1e	Flare Indices (by day)	390B 10					
C.1f	Flare Indices (by Region)						
C.3	Solar Radio Waves - Outstanding Occurrences	390B 12					
	Solar Radio Waves - Fixed Frequencies - Selected	385A 16	386A 14	387A 14	388A 16	389A 16	390A 14
C.3t	43.25, 80 and 160 MHz Selected Bursts (Culgoora)	390B 42	390B 43	390B 44			
C.4a	Solar Radio Spectral Obs. (Fort Davis)	386A 91	387A 95	388A 96	389A 92	390A 97	
C.4b	Solar Radio Spectral Obs. (Boulder)	---	---	---	---	---	
C.4d	Solar Radio Spectral Obs. (Culgoora)	387B 32	389B 29	389B 32	389A 92		
C.4e	Solar Radio Spectral Obs. (Weissenau)	386A 91	387A 95	388A 96	389A 92	390A 97	
C.4f	Solar Radio Spectral Obs. (Sagamore Hill)	386A 91	387A 95	388A 96	389A 92	390A 97	
C.4h	Solar Radio Spectral Obs. (Dwingeloo)	386A 91	387A 95	388A 96	389A 92	390A 97	
C.4i	Solar Radio Spectral Obs. (Dürnten)	386A 91	387A 95	388A 96	389A 92	390A 97	
C.4j	Solar Radio Spectral Obs. (Manila)	386A 91	387A 95	388A 96	389A 92	390A 97	
C.5e	Solar X-ray (SMS/GOES)	385A 20	---	---	---	389A 20	390A 17
C.5f	Solar X-ray (Columbia U.)						
C.6	Sudden Ionospheric Disturbances	386A 90	387A 94	388A 95	389A 91	390A 96	
D.	Geomagnetic and Magnetospheric Phenomena						
D.1a	Geomagnetic Indices Kp, Kn, Ks, Km, Ap, aa, Cp	386A104	387A108	388A108	389A102	390A107	
D.1ba	27-day Chart of Kp Indices	386A106	387A110	388A110	389A104	390A109	
D.1c	27-day Chart of C9					390A110	
D.1d	Principal Magnetic Storms	386A109	387A113	388A113	389A107	390A114	
D.1e	Reduced Magnetograms	---			---	---	
D.1f	Sudden Commencement and Solar Flare Effects	386A110	387A114	388A114	389A108	390A115	
D.1g	Equatorial Indices Dst	386A108	387A112	388A112	389A106	390A113	
F.	Cosmic Rays						
F.1a	Cosmic Ray Neutron Counts (Deep River)	386A 99	387A103	388A103	389A 97	390A106	
F.1b	Cosmic Ray Neutron Counts (Climax)	386A 99	387A103	388A103	389A 97	390A106	
F.1e	Cosmic Ray Neutron Counts (Alert)	386A 99	387A103	388A103	389A 97	390A106	
F.1f	Cosmic Ray Neutron Counts (Calgary)	386A 99	387A103	388A103	389A 97	390A106	
F.1g	Cosmic Ray Neutron Counts (Sulphur Mountain)	386A 99	387A103	388A103	389A 97	390A106	
F.1h	Cosmic Ray Neutron Counts (Thule)	---	---	---	---		
F.1i	Cosmic Ray Neutron Counts (Kiel)	386A 99	387A103	388A103	389A 97	390A106	
F.1j	Cosmic Ray Neutron Counts (Tokyo)	386A 99	387A103	388A103	389A 97	390A106	
H.	Miscellaneous						
H.60	IUWDS Alert Decisions	385A 5	386A 5	387A 4	388A 5	389A 4	390A 4
H.62	Abbreviated Calendar Record						

Note: A = Part I, B = Part II.

386A 22 listed under 1976 Aug shows that data for August 1976 were contained in *Solar-Geophysical Data* Number 386 - Part I beginning on page 22.

AUGUST 1976 DATA

Contents

	Page
Active Regions	4
Synoptic Solar Map	5
Solar Flares	
Hα Solar Flares (Standardized Data)	6-9
Daily Flare Indices	10
No-Flare-Patrol Chart	11
Solar Radio Waves	
Worldwide Outstanding Occurrences at Fixed Frequencies	12-21
Energetic Solar Particles and Plasma	22-27
Magnetograms of Geomagnetic Storm (None produced for August 1976)	

ACTIVE REGIONS

CARRINGTON ROTATION 1644

(July 21 - August 17, 1976)

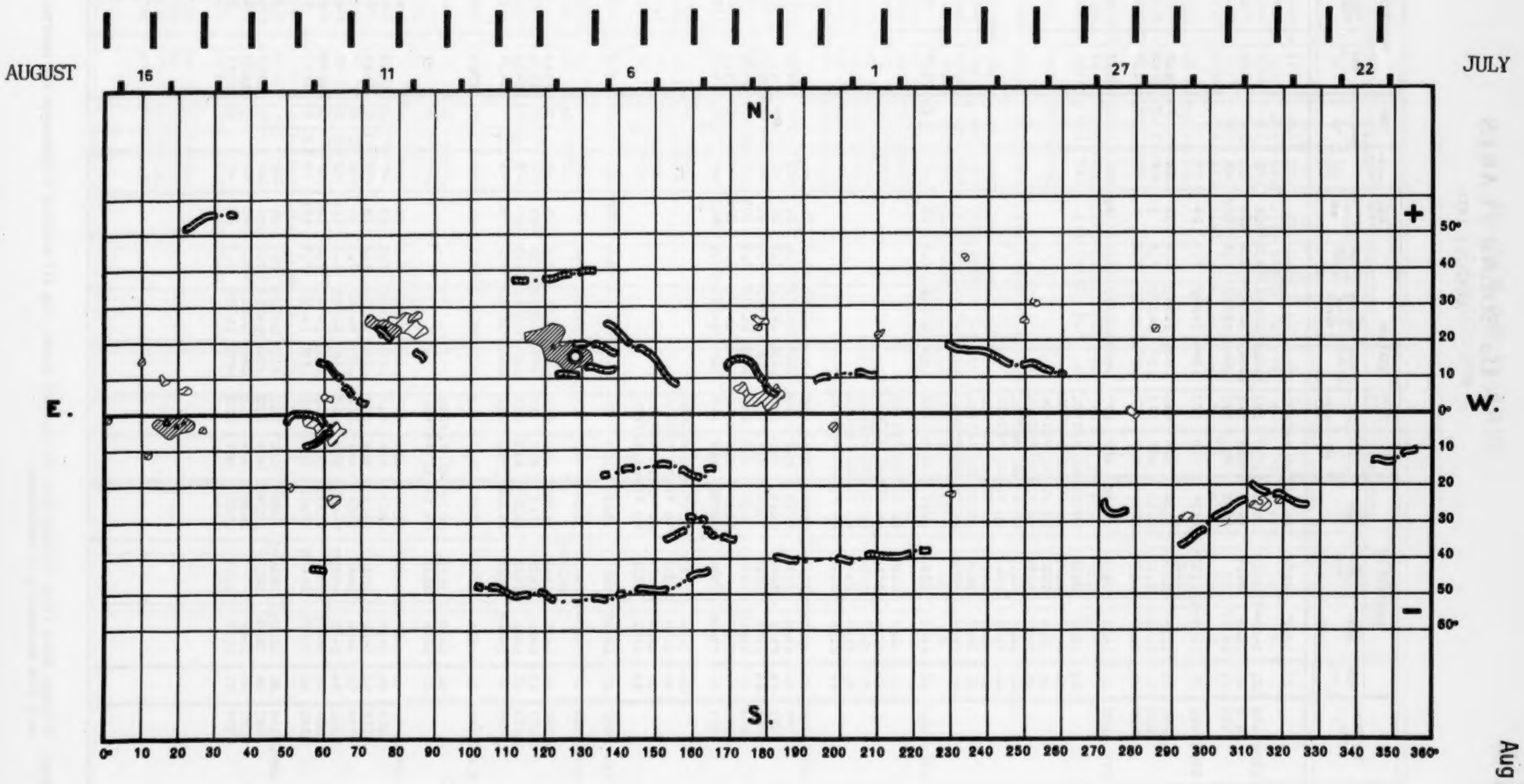
Region No.	Coordinates		Age at CMP	IMP.	Spot-less Region	Region No. in Rotation 1643	Activity at West Limb
	Lat.	Long.					
1	29°S	294°	+5	1	x		disappeared
2	24 N	285	+5	1	x		disappeared
3	0	279	-3	1	x		dispersed
4	4 N	178	>6	1	x		decreasing
5	19 N	124	>6	4			decreasing
6	28 N	84	+1	1	x		disappeared
7	25 N	75	+2	2	x		decreasing
8	23 S	62	+5	1	x		disappeared
9	4 S	59	+5	1	x		decreasing
10	4 S	26	-4	1	x		stable
11	2 S	18	0	3			decreasing

SYNOPTIC SOLAR MAP

CARRINGTON ROTATION 1644

JULY 21 TO AUGUST 17, 1976

MEUDON OBSERVATORY



Hα SOLAR FLARES

AUGUST 1976

OBSERV-ATORY	DATE 1976 AUG	START	MAX. PHASE	END	LAT.	MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP DAY	DURATION MIN.	IMPORTANCE	OBS. COND	OBS. TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.	REMARKS
	01	0012	0133	NO FLARE PATROL													
GRP63499	01	0625+0	0625	0635	N18	E90	1.000	14352	8.0	10	-N						A
CATA	01	0625	0625	0635	N18	E90	1.000	14352	8.0	10	1N	3		0625	56		
ISTA	01	0625E		0635	N19	E90	.999	14352	8.0	10D	-N						A
GRP63500	01	1110+5	1113+2 1131	1134	N18	E81	.984	14352	7.5	24	-N						
MCMA	01	1110	1113	1134	N19	E84	.991	14352	7.8	24	1N		P	1113			
MEUD	01	1115	1115	1118	N17	E78	.974	14352	7.3	3	-F		C	1115	30		D
MEUD	01	1130	1131	1134	N18	E78	.974	14352	7.3	4	-F		C	1131	40		
501 MEUD	01	1410	1413	1413D	N17	E77	.970	14352	7.4	3D	-F		C	1413	30		
	01	1932	2016	NO FLARE PATROL													
	01	2047	2123	NO FLARE PATROL													
	01	2211	2228	NO FLARE PATROL													
	01	2400	0206	NO FLARE PATROL													
	02	0211	0212	NO FLARE PATROL													
	02	1642	1643	NO FLARE PATROL													
	02	1943	1951	NO FLARE PATROL													
	02	2027	2039	NO FLARE PATROL													
	02	2119	2258	NO FLARE PATROL													
502 CULG	02	2232	2237	2257	N15	E60	.862	14352	7.4	25	-F		C	2237	20	.4	
	02	2318	0145	NO FLARE PATROL													
	03	0204	0213	NO FLARE PATROL													
	03	2047	2053	NO FLARE PATROL													
	03	2103	2104	NO FLARE PATROL													
	03	2105	0300	NO FLARE PATROL													
GRP63503	04	0931+2	0935+3	1005	N16	E41	.661	14352	7.5	34	-N				60	.8	DI
HTPR	04	0931	0935	0955	N17	E40	.651	14352	7.4	24	-N		C	0935	10	.1	D
ZURI	04	0931	0937	1001	N15	E41	.659	14352	7.5	30	-N		P	0937	60	.8	
MONT	04	0933	0937	1004	N16	E41	.661	14352	7.5	31	-N		C	0937	60		E
CATA	04	0936E	0938	1015	N16	E40	.649	14352	7.4	39D	-B	3		0938	56	.8	
MEUD	04	0948E		1000	N16	E40	.649	14352	7.4	12D	-N		C	0950	50	.7	
KIEV	04	0949E	0949	1030D	N15	E43	.684	14352	7.6	41D	-F		C	0949	100	1.3	DI
	04	2058	2135	NO FLARE PATROL													
	04	2240	2315	NO FLARE PATROL													
	05	0058	0128	NO FLARE PATROL													
	05	0142	0225	NO FLARE PATROL													
504 MONT	05	0858E	0901	0923	S12	W30	.572		3.1	25D	-F		C	0901	20		
GRP63505	05	1415+5	1419 1426+4	1520	N13	E28	.476	14352	7.7	65	-N				60	.7	D
HTPR	05	1415	1419	1520	N13	E28	.476	14352	7.7	65	-F		C	1419	20	.2	D
ZURI	05	1416	1426	1510	N12	E28	.474	14352	7.7	54	-N		C	1426	70	.8	
CATA	05	1420	1428	1520	N13	E28	.476	14352	7.7	60	-B	2		1428	67	.8	
ATHN	05	1428E	1430	1431D	N13	E28	.476	14352	7.7	3D	-N	2		1430	33	66.0	
506 HTPR	05	1658	1703	1720	N17	E22	.409	14352	7.4	22	-F		C	1703	10	.1	D
	05	2053	2100	NO FLARE PATROL													
	06	0014	0022	NO FLARE PATROL													
GRP63507	06	0427+6	0434+8	0505	N16	E17	.332	14352	7.5	38	-N				80	.8	R
TACH	06	0427		0525	N16	E17	.332	14352	7.5	58	-F		C	0448	93	1.0	E
MITK	06	0430	0434	0505	N16	E14	.291	14352	7.2	35	-N		C	0434	90	1.0	
ATHN	06	0433	0437	0504	N17	E18	.353	14352	7.5	31	-N	2	C		32		DE R
PALE	06	0433	0436U	0448D	N17	E19	.367	14352	7.6	15D	-N	2	C		92		DE
KODA	06	0437E	0442	0505D	N15	E16	.310	14352	7.4	28D	-F		P	0448	66	.7	D
MANI	06	0445E	0445U	0500D	N16	E16	.318	14352	7.4	15D	-N	2	P	0445	70	.8	F
GRP63508	06	1009+1	1014+3	1029	N15	E12	.255	14352	7.3	20	-F				30	.3	D
ZURI	06	1009	1017	1029	N15	E13	.268	14352	7.4	20	-F		C	1017	50	.5	
MEUD	06	1010		1023	N16	E12	.265	14352	7.3	13	-F		C	1015	30	.3	D
HTPR	06	1010	1014	1035	N15	E12	.255	14352	7.3	25	-F		C	1014	20	.2	

Note: Although these flare listings give all reported events, not all possible brightenings are reported. Thresholds of reporting vary from observatory to observatory.

Hα SOLAR FLARES

AUGUST 1976

OBSERV-ATORY	OBSERVED UT: DATE 1976 AUG	START	MAX. PHASE	END	LOCATION: APPROX LAT.	MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP DAY	DURA-TION MIN.	IMPOR-TANCE	OBS. COND	TYPE	MEASUREMENTS: TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.	REMARKS
GRP63509	06	1105>9	1139+6	1204	N16	E11	.253	14352	7.3	59	-N				60	.6	R
.HTPR	06	1105	1140	1220	N16	E11	.253	14352	7.3	75	-N		C	1140	50	.5	
RAMY	06	1135	1140	1205	N17	E10	.253	14352	7.2	30	-N	4	C		60		DE R
ZURI	06	1135	1145	1203	N15	E13	.268	14352	7.5	28	-F		C	1145	80	.9	
MEUD	06	1135E	1139	1155	N16	E11	.253	14352	7.3	20D	-F		C	1139	50	.5	
CATA	06	1135	1140	1155D	N16	E11	.253	14352	7.3	20D	-N	2		1140	84	.9	
	06	2322	2330	NO FLARE PATROL													
	07	0030	0118	NO FLARE PATROL													
	07	0139	0145	NO FLARE PATROL													
	07	0154	0200	NO FLARE PATROL													
GRP63510	07	0155	0200+0	0209	N12	E08	.170	14352	7.7	14	-N				80	.8	
CULG	07	0155	0200	0209	N12	E08	.170	14352	7.7	14	-N		C	0200	100	1.0	
MANI	07	0200E	0200U	0203D	N13	E08	.181	14352	7.7	3D	-N	1	V	0200	60	.6	
	07	0203	0212	NO FLARE PATROL													
511 RAMY	07	1130E	1135U	1150D	N17	W03	.194	14352	7.3	20D	-N	4	C		45		FDE
GRP63512	07	1536+4	1539+2	1550	N14	W03	.145	14352	7.4	14	-N				60	.6	
HTPR	07	1536	1539	1550	N14	W03	.145	14352	7.4	14	-N		C	1539	10	.1	
LOCA	07	1540	1541	1550	N14	W03	.145	14352	7.4	10	-N		V	1541	82	.8	
CATA	07	1540	1540	1556	N15	W02	.157	14352	7.5	10	-N	2		1540	56	.6	
	07	1646	1702	NO FLARE PATROL													
	07	1707	1708	NO FLARE PATROL													
	07	1719	1908	NO FLARE PATROL													
	07	1912	1945	NO FLARE PATROL													
	07	2017	2029	NO FLARE PATROL													
	07	2046	2102	NO FLARE PATROL													
	07	2116	2209	NO FLARE PATROL													
513 CULG	07	2138	2142	2152	N13	W06	.157	14352	7.5	14	-F		C	2142	30	.3	
	07	2245	2253	NO FLARE PATROL													
	08	0001	0214	NO FLARE PATROL													
514 CATA	08	0840	0845	0900	N15	W13	.267	14352	7.4	20	-N	2		0845	67	.7	
	08	1810	1824	NO FLARE PATROL													
	08	1834	1845	NO FLARE PATROL													
	08	2017	0315	NO FLARE PATROL													
	09	0600	0610	NO FLARE PATROL													
515 MCMA	09	2025	2026	2030	N18	W31	.536	14352	7.5	5	-N		C	2026	50	.6	EL
	09	2102	2230	NO FLARE PATROL													
	10	0133	0145	NO FLARE PATROL													
GRP63516	10	1025+1	1025+3	1037	N17	W39	.637	14352	7.5	12	-F				30	.4	
CATA	10	1025	1025	1035	N18	W39	.639	14352	7.5	10	-N	2		1025	33	.4	
HTPR	10	1026	1028	1038	N17	W39	.637	14352	7.5	12	-F		C	1028	30	.4	
517 MEUD	10	1121	1122	1125	N18	W39	.639	14352	7.5	4	-F		C	1122	40	.5	E
	10	2044	2058	NO FLARE PATROL													
	10	2102	2103	NO FLARE PATROL													
	10	2144	2254	NO FLARE PATROL													
	10	2326	2343	NO FLARE PATROL													
	10	2351	0006	NO FLARE PATROL													
	11	0012	0014	NO FLARE PATROL													
	11	0018	0019	NO FLARE PATROL													
	11	0023	0031	NO FLARE PATROL													
	11	2212	2226	NO FLARE PATROL													
GRP63518	13	0032+2	0036+7	0110	N24	W18	.416	14358	11.7	38	-N						EJ
VORO	13	0032	0036	0110	N22	W20	.418	14358	11.5	38	-N		C	0036	206	2.3	EJ
MITK	13	0033	0038	0048	N26	W16	.418	14358	11.8	15	-N		C	0038	90	1.0	E
CULG	13	0034	0043	0115	N23	W18	.405	14358	11.7	41	-F		C	0043	40	.4	
519 MITK	13	0435	0437	0440D	N25	W19	.437	14358	11.8	5D	-F		C	0437	70	.8	E
	13	1530	1536	NO FLARE PATROL													
	13	1540	1548	NO FLARE PATROL													
	13	1600	1737	NO FLARE PATROL													
	13	1753	1758	NO FLARE PATROL													

Hα SOLAR FLARES
AUGUST 1976

OBSERV- ATORY	OBSERVED UT DATE 1976 AUG	START	MAX. PHASE	END	LOCATION APPROX LAT.	MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP DAY	DURA- TION MIN.	IMPOR- TANCE	OBS. COND	TYPE	MEASUREMENTS TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.	REMARKS
	13	1816	1845	NO FLARE PATROL													
	13	1853	1955	NO FLARE PATROL													
	13	2007	2015	NO FLARE PATROL													
	13	2032	2115	NO FLARE PATROL													
	13	2329	2346	NO FLARE PATROL													
	14	0104	0140	NO FLARE PATROL													
	14	1611	1616	NO FLARE PATROL													
	14	1640	1645	NO FLARE PATROL													
	14	1710	1958	NO FLARE PATROL													
	14	2028	0021	NO FLARE PATROL													
	15	1200	1204	NO FLARE PATROL													
	15	1208	1213	NO FLARE PATROL													
	15	1218	1226	NO FLARE PATROL													
	15	1358	1402	NO FLARE PATROL													
520 MCMA	15	1402E		1417	S03	E06	.197	14366	16.0	15D	-B		C	1402	25	.3	DHT
	15	1429	1438	NO FLARE PATROL													
	15	1455	1502	NO FLARE PATROL													
521 MCMA	15	1604	1614	1624	S03	E05	.188	14366	16.0	20	-N		C	1614	25	.3	DH
	15	1754	1759	NO FLARE PATROL													
	16	2134	0024	NO FLARE PATROL													
522 CULG	16	2248	2249	2258	S04	W15	.316	14366	15.8	10	-F		C	2249	30	.3	
	17	0031	0121	NO FLARE PATROL													
	17	0145	0213	NO FLARE PATROL													
523 HTPR	17	1025	1028	1040	S03	W20	.378	14366	15.9	15	-F		C	1028	20	.2	
	17	2116	0223	NO FLARE PATROL													
524 MCMA	18	1403	1406	1429	S07	W82	.992	14356	12.4	26	-N		C	1406			D
525 MCMA	18	1426	1430	1455	S03	W36	.605	14366	15.9	29	-N		C	1430	25	.3	EH
GRP63526	18	1844+1	1845+6	1857	S12	E81	.992	14375	24.9	13	-B						HV
MCMA	18	1844	1845	1858	S12	E84	.997	14375	25.1	14	1B		C	1845			HV
PALE	18	1845	1851	1856	S12	E79	.987	14375	24.7	11	-N	4	C		83		
	18	2245	2258	NO FLARE PATROL													
527 PALE	19	0026	0027	0034	S11	E75	.973	14375	24.6	6	-F	3	C		31		
	19	0156	0206	NO FLARE PATROL													
528 MONT	19	0855	0858	0903	S05	W44	.713	14366	16.1	8	-F		C	0858	20		
GRP63529	19	0916+4	0917+3	0925	S05	W44	.713	14366	16.1	9	-F				30	.4	E
HTPR	19	0916	0917	0925	S05	W45	.725	14366	16.0	9	-F		C	0917	30	.4	E
MONT	19	0916E	0917	0923	S05	W44	.713	14366	16.1	7D	-F		C	0917	40		E
CATA	19	0920	0920	0925	S06	W44	.716	14366	16.1	5	-N	2		0920	28	.4	
GRP63530	19	1157+1	1203+5	1217	S14	E70	.954	14375	24.7	20	-F				50		E
ZURI	19	1157	1203	1217	S15	E70	.955	14375	24.7	20	-F		P	1203	60		
MCMA	19	1157	1207	1216	S14	E70	.954	14375	24.7	19	-N		C	1207	40	1.6	E
HTPR	19	1158	1208	1220	S13	E70	.953	14375	24.7	22	-F		C	1208	40		
531 MCMA	19	1831	1834	1842	S14	E67	.938	14375	24.8	11	-F		C	1834	30	1.1	E
	19	2116	2202	NO FLARE PATROL													
	19	2223	2258	NO FLARE PATROL													
	20	0036	0052	NO FLARE PATROL													
532 ZURI	20	1054	1058	1114	S02	W62	.887	14366	15.8	20	-F		C	1058	70	1.6	
GRP63533	21	0803+2	0807	0813	S02	W74	.963	14366	15.8	10	-N				60		E
MONT	21	0803	0807	0813	S03	W74	.964	14366	15.8	10	-F		C	0807	40		E
ZURI	21	0805	0805	0805D	S02	W74	.963	14366	15.8		1N		P	0805	90		
534 HTPR	21	1407	1412	1430	S03	W78	.980	14366	15.7	23	-F		C	1412	20		D
	21	2237	2336	NO FLARE PATROL													
535 MITK	22	0127	0129	0138	S04	W90	1.000	14366	15.3	11	PN		C	0129	60		
	IMP.	1 NO	CULG1	PALE1													

Hα SOLAR FLARES

AUGUST 1976

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IMPOR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DATE 1976 AUG	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP DAY	MIN.		COND	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.	
536 MITK	22	0206E	0209	0219	S04	W90	1.000	14366	15.3	13D	P F		C	0209	70		
	IMP	.1 NO	CULG1	PALE1													
537 TACH	22	0357		0405	S02.	W90	1.000	14366	15.4	8	-F		C	0402	88		
538 CULG	22	0511	0513	0521	S04	W85	.997	14366	15.8	10	-F		C	0513	20	1.0	
539 UPIC	22	0730	0735	0745	S11	E43	.724	14375	25.5	15	-F		P	0735	61		
540 UPIC	22	0820	0825	0900	S11	E43	.724	14375	25.6	40	-F		P	0825	41		
GRP63541	22	1021E	1115+0	1140D	S06	W90	1.000	14366	15.7	79	-N						
RAMY	22	1021E	1115	1140D	S07	W90	1.000	14366	15.7	79D	-N	4	C				
RAMY	22	1021E	1115	1140D	S06	W90	1.000	14366	15.7	79D	-N	4	V				
542 UPIC	22	1217E		1222D	S02	W90	1.000	14366	15.8	5D	N		P	1217			AB
543 MEUD	22	1412	1413	1420	S11	E39	.679	14375	25.5	8	-F		C	1413	60	.8	E
	22	2318	2326	NO FLARE PATROL													
	22	2336	2345	NO FLARE PATROL													
	22	2400	0039	NO FLARE PATROL													
	23	0043	0133	NO FLARE PATROL													
	23	0144	0152	NO FLARE PATROL													
	23	2240	2310	NO FLARE PATROL													
	24	0029	0030	NO FLARE PATROL													
	24	0059	0121	NO FLARE PATROL													
	24	2223	2233	NO FLARE PATROL													
	24	2400	0147	NO FLARE PATROL													
	25	0203	0217	NO FLARE PATROL													
544 MEUD	25	1415	1415	1420	S10	W03	.297	14375	25.4	5	-F		C	1415	40	.4	E
	26	1738	1802	NO FLARE PATROL													
	26	1825	2137	NO FLARE PATROL													
	26	2243	2245	NO FLARE PATROL													
	28	1626	1647	NO FLARE PATROL													
	29	1930	2105	NO FLARE PATROL													
	29	2309	2314	NO FLARE PATROL													
545 MCMA	31	1958E	2005	2038	N19	W54	.806	14403	27.8	40D	-N		C	2005	50	.9	E
	31	2111	2121	NO FLARE PATROL													
	31	2123	2147	NO FLARE PATROL													
	31	2221	2225	NO FLARE PATROL													

"Remarks":

A = Eruptive prominence whose base is less than 90° from central meridian.
B = Probably the end of a more important flare.
C = Invisible 10 minutes before.
D = Brilliant point.
E = Two or more brilliant points.
F = Several eruptive centers.
G = No visible spots in the neighborhood.
H = Flare accompanied by a high speed dark filament.
I = Active region very extended.
J = Distinct variations of plage intensity before or after the flare.
K = Several intensity maxima.
L = Existing filaments show signs of sudden activity.
M = White-light flare.
N = Continuous spectrum shows effects of polarization.
O = Observations have been made in the calcium II lines H and K.
P = Flare shows helium D_3 in emission.
Q = Flare shows the Balmer continuum in emission.
R = Marked asymmetry in Hα line suggests ejection of high velocity material.
S = Brightness follows disappearance of filament (same position).
T = Region active all day.
U = Two bright branches, parallel (||) or converging (Y).
V = Occurrence of an explosive phase: important and abrupt expansion in about a minute with or without important intensity increase.
W = Great increase in area after time of maximum intensity.
X = Unusually wide Hα line.
Y = System of loop-type prominences.
Z = Major sunspot umbra covered by flare.

DAILY FLARE INDICES
Includes all Flares

AUGUST 1976

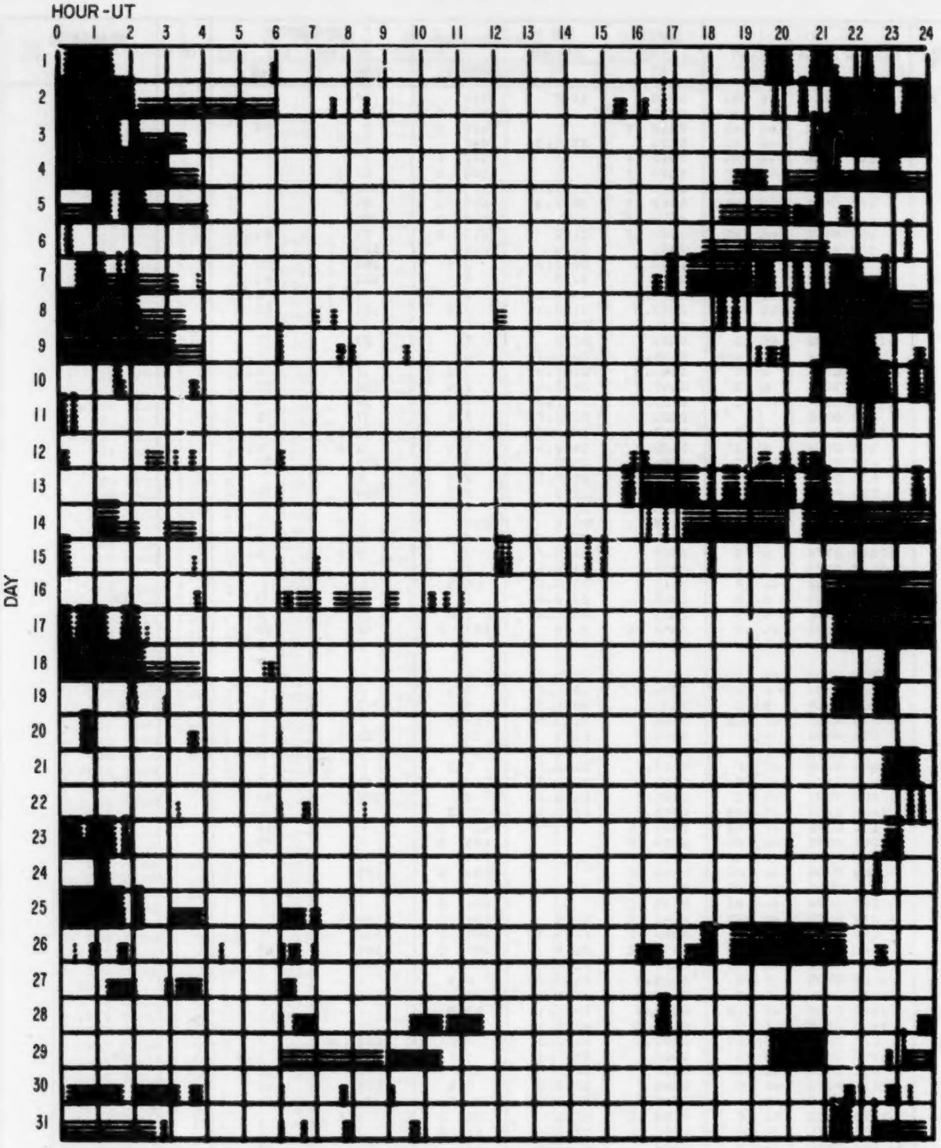
Date	Flare Index	HR. OBS.	Date	Flare Index	HR. OBS.	Date	Flare Index	HR. OBS.
760801	3.08	18.9	760810	4.17	21.9	760820	.84	23.7
760802	.98	19.5	760811	0.00	23.6	760821	2.84	23.0
760803	0.00	17.8	760813	11.24	19.4	760822	9.23	23.1
760804	1.91	22.8	760814	0.00	15.6	760823	0.00	22.5
760805	10.77	22.7	760815	10.56	23.3	760824	0.00	21.7
760806	5.75	23.7	760816	6.08	20.7	760825	5.31	23.8
760807	17.85	18.7	760817	6.91	17.6	760826	0.00	20.4
760808	8.18	14.4	760818	5.07	23.8	760828	0.00	23.7
760809	3.60	22.4	760819	5.65	22.5	760829	0.00	22.3
						760831	1.90	23.4

When no Flare Index is given, it is 0 for that day.

INTERVALS OF NO FLARE PATROL OBSERVATION

FOR PRECEDING SOLAR FLARE TABLE

AUGUST 1976



Observatories included in total patrol:

Athenes
Bucharest
Catania
Culgoora
Haute Provence
Herstmonceux
Huancayo
Hurbanovo
Istanboul
Kharkov
Kiev
Kodaikanal
Locarno
Lvov
Manila
McMath-Hulbert
Meudon
Mitaka
Monte Mario
Palehua
Ramey
Tachkent
Tehran
Upice
Voroshilov
Wendelstein
Zürich

Times of no flare patrol are shown by the shaded area for each day divided into times of no cinematographic patrol (bottom half of day) and times of neither visual nor cinematographic patrol (top half of day).

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

AUGUST 1976

AUG 1976	FREQUENCY STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY $10^{-22} Wm^{-2} Hz^{-1}$ PEAK	MEAN	INT	POLARIZATION OR REMARKS
1	207 VORO	44 NS	0000	0122	180	70			
	100 GORK	44 NS	0300 E		420 D		5		
	200 GORK	44 NS	0300 E		420 D		50		
	221 ABST	44 NS	0500	0715.5	240	17			
	127 TORN	44 NS	0550 E		550 D				
	260 ONDR	44 NS	0620 E		560 D	69			
	245 SGMR	44 NS	0940 E	2133.6	859 D	326.6			
	410 SGMR	44 NS	0940 E	1707.9	859 D	94			
	200 HIRA	44 NS	1945 E	0815	840 D	270	60		SL
	100 HIRA	44 NS	1945 E	2137	145 D	70	40		SL
	207 VORO	44 NS	2300	0154	240	169			
	100 HIRA	45 C	0006.5	0007.6	2.5	380	100		SL
	100 HIRA	45 C	0012	0015	4	450	80		SL
	2000 TYKW	5 S	0014.8	0015.2	3	1.3	0.3		
	100 HIRA	45 C	0223.5	0223.8	3.5	300	60		WL
	1000 TYKW	5 S	0224	0224.8	5	7	1.7		30R
	2000 TYKW	45 C	0224	0226	5	23	3		SR
	950 GORK	20 GRF	0448.1	0456.7	16	2.4	1.2		
	950 GORK	1 S	0646.9	0647.4	1.1	1.7	0.6		
	100 GORK	6 S	0647.2	0647.4	0.4	500	250		
	536 ONDR	45 C	0715.2	0717.8	4.7	26	4		
	536 ONDR		0923	0923.5	3.5	7	2		
	1000 TYKW	45 C	0717.2	0717.7	2	2.2	0.6		30R
	950 GORK	1 S	0820.2	0820.8	0.8	1.8	0.6		
	127 TORN	45 C	0904.7	0905	2	350	170		
	536 ONDR	8 S	0947.2	0947.5	0.6	6			
	234 POTS	45 C	1322.9	1323	0.2	260	50		
	18 MCHA	4 F	1524	1528	4			1	
	2800 OTTA	21 GRF	2155	2330	215	2.2	1.1		
	1000 TYKW	5 S	2214.5	2215.3	1.5	1.3	0.4		60R
	2800 OTTA	1 S	2222	2222.7	2	0.8	0.4		
	1400 SYDN	2 S	2310.1	2310.5	1				
	700 SYDN	40 F	2310.2	2310.5	29.5				
	1000 TYKW	5 S	2310	2310.4	1	21	3		30R
	1000 TYKW	5 S	2321	2321.4	1.5	1	0.4		SR
	500 HIRA	24 R	2347 E	0720	590 D	80	10		SL
	1000 TYKW	45 C	2349	2355	8	2	0.6		90R
2	700 SYDN	45 C	0004.6	0006.5	5				
	700 SYDN	4 S	0036.2	0036.7	2.1				
	1000 TYKW	5 S	0036	0036.7	2	1	0.3		SR
	700 SYDN	47 GB	0145	0153.5	17.1				
	606 MANI	4	0145	0153	30	32.7	8.6		
	1415 MANI	2	0150	0151.9	10	8.5	3.3		
	1400 SYDN	40 F	0150.7	0151.7	6.2				
	1000 TYKW	45 C	0150	0154.3	16	11	2		30R
	100 HIRA	45 C	0151.5	0153.3	3	380	80		WL
	1400 SYDN	47 GB	0218.3	0220.5	36.2				
	100 GORK	44 NS	0303 E		417 D		10		
	200 GORK	44 NS	0303 E		420 D		250		
	221 ABST	44 NS	0500	0815.5	240	31			
	260 ONDR	44 NS	0534 E		584 D	172			
	536 ONDR	44 NS	0534 E		584	41			
	127 TORN	44 NS	0730 E		450 D				
	410 SGMR	44 NS	0941 E	2250	856 D	199.9			
	245 SGMR	44 NS	0941 E	2249.8	856 D	660			
	200 HIRA	44 NS	1950 E	2310	825 D	180	40		SL
	207 VORO	44 NS	2200	2232	300	208			
	1400 SYDN	1 S	0309.3	0309.3	0.2				
	1400 SYDN	45 C	0326.3	0331.7	9				
	1400 SYDN	47 GB	0353.3	0407.1	29.2				
	1400 SYDN	2 S	0501.2	0501.3	0.3				
	127 TORN	47 GB	0602.7	0602.8	4	2300 U			
	1000 TYKW	5 S	0617	0617.6	1.5	12	1.5		20R
	536 ONDR	46 C	0657	0720	53	72	15		
	234 POTS	45 C	0659	0703.1	7.4	175	10		
	606 MANI	40	0700.2	0710.4	38.5	76	26.1		
	1470 POTS	40 F	0700 E	0710	23 D	9.7			
	3000 POTS	22 F	0700 E	0710	38 D	4.1			
	808 ONDR	46 C	0700	0713.6	36	122	15		
	1000 TYKW	45 C	0700	0720.7	25	33	9		15R
	1000 TYKW		0700	0707		26			
	1000 TYKW		0700	0709.8		32			
	1000 TYKW		0700	0703.3		23			
	100 GORK	46 C	0701.9	0702.9	1.4	440			
	100 GORK		0701.9	0708.8	1.6	440			
	100 GORK		0701.9	0709.7	1.6	890			
	100 GORK		0701.9	0743.7	156	1000			
	3100 CRIM	21 GRF	0701	0708	15	2.5	1		
	510 POTS	41	0701	0720.5	25	120	12		
	930 BORD	45 C	0701	0720.7	24	247	18		
	1415 MANI	22	0702.1	0709.8	19.6	13.2	3.3		
	100 HIRA	45 C	0702	0702.5	1.5	1200	500		WL
	2000 TYKW	42 SER	0702	0702.7	22	8	1		80R

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

AUGUST 1976

AUG 1976	FREQUENCY STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY $10^{-22} Wm^{-2} Hz^{-1}$ PEAK	MEAN	INT	POLARIZATION OR REMARKS
	3100 CRIM	1 S	0703	0703.5	1	2			
	950 GORK	46 C	0705 E	0706.9	16 E	28			
	950 GORK		0705 E	0709.8		47			
	950 GORK		0705 E	0713.2		27			
	950 GORK		0705 E	0720.8		61			
	950 GORK	29 PBI	0705 E	0721	28.1	12	2.5		
	3100 CRIM	1 S	0707	0708	2	3			
	3100 CRIM	1 S	0710	0710	1	2.5			
	100 HIRA	27 RF	0710	0744	155 D	400	120		SL
	950 GORK	20 GRF	0809.6	0816.4	13.8	3.2	1.3		
	808 ONDR	2 S/F	0918.7	0919	0.7	12			
	808 ONDR	40 F	0950.8	0954	13.2	22	8		
	950 GORK	22 CRF	0953.1	0954.4	9.6U	7	2.6		
	100 GORK	46 C	0953.5	0955.4	81	400			
	100 GORK		0953.5	1001		400			
	930 BORD	40 F	0953	0954.4	11	13	3		
	234 POTS	41	0954	0959.3	5.5	550	6		
	245 SGMR	7 C	1155.8	1157.1	3	378	75.6		
	410 SGMR	6 S	1156	1156.8	1.7	41.1	13.2		
	808 ONDR	8 S	1156.3	1157	1	42			
	2695 SGMR	1 S	1156.4	1156.6	.9	27	.8		
	234 POTS	45 C	1156.4	1156.7	1	525	50		
	2695 PENT	1 S	1156.5	1156.6	1	1.2	0.5		
	127 TORN	5 S	1157	1157.1	1.5	95	40		
	234 POTS	45 C	1208.1	1208.2	0.4	350	70		
	234 POTS	45 C	1213	1213.2	0.3	450	100		
	127 TORN	45 C	1233.2	1233.6	3	320	90		
	234 POTS	45 C	1243	1243.2	0.4	250	25		
	18 MCMA	6 S	1323	1325	4			1	
	808 ONDR	40 F	1334.3	1335.5	2.2	14	5		
	228 HARS	45 C	1334.7	1335.3	1.3	290	140		
	127 TORN	45 C	1334.9	1336.3	2.2	210	50		
	18 MCMA	6 S	1743	1744	2			1	
	18 MCMA	4 F	1809	1813	4			1	
	1400 SYDN	40 F	2159.5	2219	23.7				
	4995 BOUL	20 GFR	2226.5	2230.5	11.5	10	3		
	1420 BOUL	40 F	2227.5	2233	8	39	12		
	606 MANI	40	2228	2249.9	31	186	43.4		
	1415 MANI	40	2228	2230.3	29	42.2	9.6		
	245 SGMR	48 C	2228	2230.2	6	540	162		
	410 SGMR	6 S	2228	2230.6	5	95.2	27.6		
	1400 SYDN	45 C	2228	2231.5	4.2				
	1400 SYDN	40 F	2228.3	2230.4	28.1				
	100 HIRA	45 C	2228.5	2230	3	1000	270		ML
	2000 TYKW	45 C	2228.5	2234.9	12.5	22	2.5		
	1000 TYKW	45 C	2228	2231.5	30	57	7		4OR
	1000 TYKW		2228	2230.2		20			
	1000 TYKW		2228	2235.3		31			
	1000 TYKW		2228	2242.6		22			
	1000 TYKW		2228	2249.7		28			
	200 HIRA	45 C	2228	2230	4	480	170		SL
	500 HIRA	45 C	2228	2249	31	120	25		ML
	2800 OTTA	21 GRF	2229	2239	27	1.4	0.7		
	18 MCMA	6 S	2230	2233	5			2	
	700 SYDN	48 GB	2234.3	2250	16.2				
	700 SYDN	29 PBI	2250.5	2251	8.6				
	2800 OTTA	1 S	2234.5	2235.3	2	2	1		
	100 HIRA	27 RF	2234	2309	60	100	40		ML
	2695 BOUL	1 S	2235	2236	2.5	4	1		
	1420 BOUL	8 S	2237.5	2239	2	18	3		
	1420 BOUL	8 S	2241.5	2242.5	2	6	2		
	2800 OTTA	8 S	2242.5	2242.5	0.5	1.4	0.7		
	2000 TYKW	5 S	2242	2242.5	1.5	2.8	1		
	4995 BOUL	45 C	2243.5	2245	5	10	3		
	1420 BOUL	8 S	2248.5	2249	2.5	7	2		
	100 HIRA	45 C	2249.5	2249.9	1	450	160		ML
	2000 TYKW	5 S	2249.5	2249.8	1	1.7	0.6		
	2800 OTTA	1 S	2249.8	2250	1.5	1	0.5		
	4995 BOUL	3 S	2256.5	2258.5	4.5	8	3		
	1000 TYKW	45 C	2310	2310.4	6	1.9	0.4		MR
3	700 SYDN	40 F	0005.6	0009.6	25.3				
	4995 BOUL	8 S	0005	0001	2	20	7		
	1420 BOUL	45 C	0005	0008.5	5	4	1		
	1000 TYKW	45 C	0005	0009.6	35	11	2		6OR
	2000 TYKW	45 C	0006	0007.3	5	2.4	0.7		
	2000 TYKW		0006	0009.6		2			
	1400 SYDN	28 PRE	0005.5	0007.3	3.9				
	1400 SYDN	45 C	0009.5	0009.7	2.1				
	4995 BOUL	3 S	0102	0103	1.5	10	3		
	2695 BOUL	45 C	0102	0105.5	7	6	2		
	700 SYDN	8 S	0104.2	0004.3	0.3				
	700 SYDN	8 S	0105.3	0105.5	0.4				
	700 SYDN	45 C	0112.7	0114.2	3.8				
	100 HIRA	27 RF	0123	0132.5	50	60	15		SL

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES
AUGUST 1976

AUG 1976	FREQUENCY STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY $10^{-22} Wm^{-2} Hz^{-1}$ PEAK	MEAN	INT	POLARIZATION OR REMARKS
	700 SYDN	4 S	0125.9	0126.4	0.7				
	700 SYDN	40 F	0148.5	0154.1	7.6				
	1000 TYKW	45 C	0151	0154.1	7	2.3	0.5		SR
	700 SYDN	40 F	0212.3	0228.7	24				
	1000 TYKW	45 C	0212	0228.7	30	5.4	0.8		MR
	1000 TYKH	45 C	0245	0259.8	17	2.1	0.3		MR
	200 GORK	44 NS	0300 E		420 D		50		
	100 GORK	44 NS	0309		351 D		5		
	221 ABST	44 NS	0500	0707	240	31			
	127 TORN	44 NS	0550 E	1018.6	550 D	100			
	536 ONDR	44 NS	0622 E		544 D	40			
	260 ONDR	44 NS	0622 E		544 D	121			
	245 SGMR	44 NS	0942 E	2326.8	854 D	1527 U			
	410 SGMR	44 NS	0942 E	1955.9	854 D	247 U			
	200 HIRA	44 NS	1950 E	2356	820 D	370	30		SL
	207 VORO	44 NS	2200	2254	300	230			
	1000 TYKW	45 C	0309	0319.3	23	2	0.5		MR
	950 GORK	4 SF	0319.6	0320.7	1.9	9.5	5.5		
	950 GORK	29 PBI	0319.6	0321.4	5.2	4.3	1		
	1000 TYKH	45 C	0343	0348.8	30	3	0.6U		MR
	606 MANI	40	0444.8	0506.7	38.8	32.1	5.1		
	1000 TYKW	45 C	0445	0506.3	50	15	1.7		45R
	1000 TYKW		0445	0454.8		11			
	1000 TYKW		0445	0459.6		9			
	1000 TYKW		0445	0511.6		6			
	950 GORK	22 GRF	0448.1	0454.8	48.5	17	2.2		
	700 SYDN	40 F	0448.1	0506.8	31.9				
	500 HIRA	45 C	0448	0453	38	25	5		SL
	2000 TYKW	5 S	0451	0455.2	7	1.1	0.4		70R
	100 GORK	41 F	0453.6	0455.7	9	380			
	100 GORK		0453.6	0500.9		380			
	100 HIRA	45 C	0455	0455.5	2	580	130		WL
	100 HIRA	45 C	0459.5	0459.5	0.50	460	90		WL
	1400 SYDN	40 F	0502.7	0503.8	37.3				
	100 GORK	41 F	0633.8	0639.4	9.6	450			
	100 GORK		0633.8	0643.1		450			
	950 GORK	1 S	0638.4	0639.4	1.1	1.3	0.5		
	536 ONDR	2 S/F	0705.5	0707	5.6	62			
	1000 TYKW	45 C	0705.5	0706.7	3	2.6	0.7U		70R
	100 GORK	41 S	0705.6	0706.7	2.7	450			
	950 GORK	1 S	0705.9	0706.8	3.2	2.8	1		
	100 HIRA	45 C	0706	0706.7	2	440	100		WL
	127 TORN	45 C	0706.2	0707.2	3.9	250	65		
	3100 CRIM	24 R	0722	0819		3.5			
	950 GORK	1 S	0732.1	0735	5.7	2.8	0.8		
	950 GORK	20 GRF	0902.3	0911.5	12.7	4.1	2.4		
	234 POTS	45 C	0956.5	0956.7	0.4	500	80		
	9240 ARCE	22 GRF	1018.6	1030.5	45				
	2695 PENT	240AR	1227	1234	7	1.2	0.6		
	2695 PENT	2 S/F	1227	1230.2	5	2.2	1.1		
	2695 PENT	24P R	1234		96	1.2			
	234 POTS	45 C	1304.9	1305.4	0.8	350	70		
	2695 PENT	240 R	1410	1530	80	1.5	0.8		
	4995 BOUL	3 S	1515	1521	14	18	6		
	2695 PENT	24P R	1530		450 D	1.5			
	2695 BOUL	3 S	1533	1534	4.5	4	1		
	2695 BOUL	8 S	1716	1716.5	1	12	4		
	4995 BOUL	8 S	1720	1720.5	1	39	13		
	2695 BOUL	8 S	1721.5	1722.5	1.5	15	5		
	4995 BOUL	8 S	1743.5	1744	1	32	11		
	4995 BOUL	8 S	1746	1746.5	1.5	14	5		
	2695 BOUL	45 C	1747	1748	3.5	8	3		
	2695 BOUL	8 S	1752	1752.5	1	3	1		
	4995 BOUL	1 S	1801	1801.5	1.5	8	3		
	4995 BOUL	1 S	1807	1807.5	1.5	10	3		
	2695 BOUL	8 S	1808	1808.5	1.5	15	5		
	2695 BOUL	40 F	1859	1900	4	23	7		
	2695 BOUL	40 F	1928.5	1931.5	6.5	53	19		
	500 HIRA	27 RF	1950 E	2029	60 D	120	8		SL
	18 MCMA	42 SER	1957	2003	6			1	
	100 HIRA	27 RF	2008		35		70		
	100 HIRA		2008	2025		910			ML
	100 HIRA		2008	2035.8		600			ML
	100 HIRA		2008	2029.2		780			ML
	500 HIRA	27 RF	2200	2326	135	70	15		SL
	2695 BOUL	45 C	2255.5	2257.5	8.5	15	5		
	4995 BOUL	1 S	2256.5	2257.5	2	10	3		
	4995 BOUL	45 C	2300	2302.5	2.5	33	11		
	2800 OTTA	20 GRF	2320	2340	50	1.2	0.6		
	700 SYDN	40 F	2321.5	2332.3	42.5				
	100 HIRA	27 RF	2321	2350	92	100	20		SL
	1420 BOUL	8 S	2324.5	2325.5	2.5	3	1		
	1400 SYDN	28 PRE	2312.3	2316.2	9.2				
	1400 SYDN	40 F	2325.8	2341.4	35.8				
	100 HIRA	45 C	2325	2326.2	2	1000	220		WL

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

AUGUST 1976

AUG 1976	FREQUENCY	STATION	TYPE		STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY $10^{-22} Wm^{-2} Hz^{-1}$ PEAK	MEAN	INT	POLARIZATION OR REMARKS
	1000	TYKW	45	C	2325	2339.7	50	31	4		MR
	2695	BOUL	40	F	2326.5	2328	5.5	17	6		
	1420	BOUL	40	F	2331.5	2341	11.5	18	2		
	100	HIRA	45	C	2331.6	2332.5	3	610	70		ML
	2000	TYKW	45	C	2332	2334.2	3.5	8	1		95R
	2000	TYKW	45	C	2339	2339.8	4	3.2	1		90R
	1420	BOUL	3	S	2345.5	2349	6	2	1		
4	700	SYDN	2	S	0000.5	0000.9	0.7				
	1000	TYKW	45	C	0019	0020.9	7	1.9	0.6		
	700	SYDN	2	S	0114.8	0115.3	1.7				
	1000	TYKW	45	C	0142	0215.2	40	2.9	0.9		50R
	700	SYDN	2	S	0151.1	0151.3	0.5				
	700	SYDN	40	F	0157	0217.9	25				
	200	GORK	44	NS	0300 E		600 D		10		
	100	GORK	43	NS	0300 E		348		5		
	221	ABST	44	NS	0500	0510	240	24			
	260	ONDR	44	NS	0620 E		540 D	94			
	536	ONDR	44	NS	0620 E		540 D	17			
	127	TORN	43	NS	0810 U		410 D				
	100	HIRA	43	NS	0845	0858	50 D	35	20		SL
	100	GORK	44	NS	0848		252 D		90		
	245	SGMR	44	NS	0943 E	1653.9	852 D	498			
	410	SGMR	44	NS	0943 E	1501.2	852 D	50.9			
	606	SGMR	43	NS	1304	1318	416 D	21.5			
	100	HIRA	44	NS	1950 E	2110	230 D	12	6		SL
	200	HIRA	44	NS	1950 E	0433	820 D	260	130		SL
	207	VORO	44	NS	2200	0023	300	208			
	950	GORK	20	GRF	0511.4	0559.9	99.8	5.5	3		
	700	SYDN	2	S	0524	0524.2	0.9				
	1000	TYKW	45	C	0529	0530.3	5	1.9	0.9		50R
	100	HIRA	41	F	0634	0638.5	9	1200			MR
	950	GORK	21	GRF	0910.7	0939	88.9	4.9	2		
	100	GORK	46	C	0919.9	0920.7	17.8	550			
	100	GORK			0919.9	0929.3		550			
	100	GORK			0919.9	0931.3		510			
	127	TORN	49	GB	0920	0921.5	18	280	100		
	127	TORN			0920	0930.3	3	1500	500		
	200	GORK	48	C	0920.2	0920.7U	17.2	390			
	200	GORK			0920.2	0931.3		31000			
	200	GORK			0920.2	0933.6		31000			
	536	ONDR	41	F	0921	0938	33	70	11		
	260	ONDR	41	F	0923.6	0929	155	213	41		
	234	POTS	45	C	0925	0929.9	11	3500	70		
	510	POTS	45	C	0925	0928.5	19	35			
	950	GORK	46	C	0928.7	0937	10.3	34			
	950	GORK			0928.7	0938.6		133			
	808	ONDR	41	F	0928.8	0938.1	10.5	107	22		
	1470	POTS	46	F	0929	0931.8	21	28	3.4		
	9240	ARCE	20	GRF	0930.1	0936.6	47.5				RECORD DIST
	3100	CRIM	1	S	0930	0936	12	3.5	1		
	3000	POTS	22	F	0931	0937	12	4.1			
	237	TRST	47	GB	0931	0931.5	1.2	2500			2R
	9100	GORK	1	S	0934	0936.5	5	4.1	2		
	950	GORK	45	C	0955.9	0956.1	2.1	6.9	3		
	950	GORK			0955.9	0957.2		8			
	1470	POTS	2	F	0956	0957	2.5	1.7			
	234	POTS	41		1012.3	1012.4	11	500	1		
	950	GORK	2	S	1029	1029.2	1	18	8		
	9240	ARCE	1	S	1034	1034.5	1.2				
	234	POTS	40	F	1247	1248.4	1.7	875	20		
	234	POTS	40	F	1346.6	1347.6	1.1	350	25		
	930	BORD	3	S	1525	1525.3	0.7	23	2		
	18	MCMA	6	S	1609	1610	3			1	
	18	MCMA	42	SER	1638	1647	10			2	
	18	MCMA	42	SER	1821	1823	10			1	
	100	HIRA	45	C	2016	2017.7	4	320	80		ML
	700	SYDN	40	F	2231.7	2259.9	40.3				
	1000	TYKW	45	C	2249	2258.8	15	9	1		95R
5	1000	TYKW	45	C	0013	0015.3	12	2.8	0.6		95R
	100	HIRA	45	C	0021.3	0021.8	1.7	220	80		ML
	700	SYDN	40	F	0034.3	0036.3	10.8				
	1000	TYKW	45	C	0043	0046.1	11	4.6	1.3		95R
	100	HIRA	43	NS	0150	0455	455 D	40	20		SL
	200	GORK	44	NS	0300 E		600 D		100		
	100	GORK	44	NS	0301 E		600 D		10		
	221	ABST	44	NS	0500	0814	240	47			
	260	ONDR	44	NS	0550 E		570 D	101			
	127	TORN	44	NS	0550 E		550 D				
	177	DWIN	44	NS	0855		247 D	400 D	200		
	169	DWIN	44	NS	0855		247 D	300	75		
	160	DWIN	44	NS	0855		247 D	150	40		
	606	SGMR	44	NS	0944 E	1502.5	850 D	14.6			
	245	SGMR	44	NS	0944 E	2243.3	850 D	363.9			

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES
AUGUST 1976

AUG 1976	FREQUENCY	STATION	TYPE		STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY $10^{-22} Wm^{-2} Hz^{-1}$ PEAK	FLUX DENSITY MEAN	INT	POLARIZATION OR REMARKS
	410	SGMR	44	NS	0944 E	1428.5	850 D	87.4			
	200	HIRA	44	NS	1950 E	0823	820 D	390	80		SL
	207	VORO	44	NS	2200	0235	300	52			
	100	HIRA	43	NS	2315	0538	620 D	680	200		SL
	1000	TYKW	45	C	0209	0220.2	23	5	1		95R
	700	SYDN	45	C	0210	0221.7	21.4				
	2000	TYKW	5	S	0215	0218.5	10	0.9	0.3		OR
	1400	SYDN	20	GRF	0216.1	0218.5	12.6				
	1000	TYKW	45	C	0242	0246.5	14	3.7	0.5		70R
	2000	TYKW	5	S	0246.4	0246.7	0.6	0.6	0.2		SR
	700	SYDN	20	GRF	0315.5	0317	7.2				
	700	SYDN	45	C	0316.4	0321.8	7.6				
	1000	TYKW	45	C	0316	0317.6	11	2.8	1		95R
	1000	TYKW	45	C	0345	0352.8	17	3	0.9		70R
	700	SYDN	40	F	0348.5	0352.7	19.3				
	606	MANI	4		0350.3	0355.3	9.3	11.7	4.6		
	1000	TYKW	45	C	0442	0443.6	10	1.7	0.5		50R
	1000	TYKW	5	S	0508	0508.4	2	0.8	0.2		SR
	100	GORK	6	S	0600	0603	0.9	350	170		
	234	POTS	45	C	0651.6	0651.8	0.4	300	60		
	127	TORN	7	C	0719.3	0721.3	3	110	45		
	536	ONDR	40	F	0820		200	15			
	100	HIRA	45	C	0827.5	0828.6	11.5	340	30		ML
	500	HIRA	45	C	0827.5	0828.8	1.5	40	10		ML
	127	TORN	45	C	0828.3	0829.5	4.3	150	30		
	950	GORK	1	S	0828.7	0829.1	1	2.5	1.1		
	950	GORK	1	S	0853.5	0855.6	4.7	2.5	0.9		
	9240	ARCE	1	S	1036.4	1036.8	0.9				
	9240	ARCE	29	PBI	1037.3		6				
	808	ONDR	8	S	1110	1110	0.2	32			
	9240	ARCE	20	GRF	1411.7	1421.8	71				
	7000	SAOP	21	GRF	1411.7		112.3		5.7		
	2800	OTTA	22	GRF	1412	1421	80	4.8	2.4		
	7000	SAOP	20	GRF	1418.3		5.6		2		
	7000	SAOP	20	GRF	1426.2		4		1.1		
	18	MCMA	42	SER	1920	1931	39			1	
	1420	BOUL	8	S	2005.5	2006.5	1.5	9	3		
	100	HIRA	45	C	2008.5	2009.3	1.5	330	100		ML
	2800	OTTA	22	GRF	2054	2058	65	1.6	0.8		
	1420	BOUL	8	S	2057.5	2058.5	1.5	5	2		
	1420	BOUL	1	S	2104	2105.5	4	3	1		
	4995	BOUL	3	S	2225	2226	4	8	3		
	1420	BOUL	8	S	2228.5	2229	1	25	8		
	1400	SYDN	45	C	2229	2229.9	1				
	1000	TYKW	5	S	2355	2356.4	3	1.5	0.7		SR
6	1000	TYKH	5	S	0112	0113	2	0.7	0.2		
	200	GORK	44	NS	0310 E		50		70		
	100	GORK	44	NS	0314 E		346 D		44		
	200	GORK	44	NS	0400 E		354 D		500		
	221	ABST	44	NS	0500	0740	240	95			
	127	TORN	44	NS	0540 E	0712	550 D	2000			
	260	ONDR	44	NS	0555 E		575 D	202			
	245	SGMR	44	NS	0945 E	1011.9	848 D	332.3			
	410	SGMR	44	NS	0945 E	1532.8	848 D	283			
	207	VORO	44	NS	2100	0208	360	17			
	200	HIRA	43	NS	2305	0207	630 D	23	4		ML
	1000	TYKW	45	C	0409	0410.1	6	7	0.5		10R
	1400	SYDN	40	F	0410.1	0412.7	8.7				
	950	GORK	40	F	0410.2	0410.5	4.7	3.6			
	950	GORK			0410.2	0414.8		3.4			
	2000	TYKW	45	C	0410	0415.9	7	6	1		90R
	1000	TYKW	45	C	0423	0434.3	17	58	9		20R
	1000	TYKW			0423	0425.8		46			
	1000	TYKW			0423	0432.6		49			
	1000	TYKW			0423	0438.1		49			
	2000	TYKW	45	C	0423	0435.5	18	23	4		55R
	2000	TYKW	29	PBI	0441		40	2	1		
	950	GORK	46	C	0424.3	0425.9	14.5	61	20		
	950	GORK			0424.3	0432.5		82			
	950	GORK			0424.3	0438.4		88			
	950	GORK	29	PBI	0424.3	0439.1	166.9U	13	4		
	606	MANI	22		0424.5	0433.9	45.5	22.6	9.4		
	1415	MANI	4		0424.5	0432.3	16	221	22.1		
	1400	SYDN	2	S	0425.3	0425.8	1.4				
	700	SYDN	45	C	0425.4	0425.6	1.4				
	100	GORK	6	S	0425.5	0425.9	0.6	1000	500		
	700	SYDN	40	F	0428.4	0502.1	60.1				
	2695	MANI	2		0430	0432.3	10.5	7	2.8		
	2950	GORK	22	GRF	0430	0432.1	10.9	7.5	4		
	1400	SYDN	45	C	0430.2	0431.8	10.7				
	500	HIRA	24	R	0430	0837	300 D	40	8		ML
	3750	TYKW	5	S	0430	0432	50	4	2		OR
	1000	TYKW	27	RF	0430	0448	62	10	3		45R
	9400	TYKW	5	S	0430	0432	40	8	2		OL

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

AUGUST 1976

AUG 1976	FREQUENCY	STATION	TYPE		STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY $10^{-22} Wm^{-2} Hz^{-1}$ PEAK	FLUX DENSITY MEAN	INT	POLARIZATION OR REMARKS
	127	TORN	47	GB	0616	0618.8	4	700	200		
	234	POTS	45	C	0619	0837	209	450			
	1000	TYKW	45	C	0623 U	0627.8	9 U	5	1 U		SR
	536	ONDR	41	F	0625	0838.5	160	32	4		
	808	ONDR	8	S	0629.2	0629.2	0.2	32			
	950	GORK	20	GRF	0758.7		22.1				
	950	GORK	20	GRF	0836	0849 U	29.6	3.5	1.5		
	1470	POTS	4	F	1007	1011.7	12	14	2.6		
	3000	POTS	4	F	1011	1011.8	6	8.7			
	3100	CRIM	1	S	1011	1012	4	5	2		
	237	TRST	41	F	1012.3	1012.7	0.8	300			8R
	245	SGMR	6	S	1056.2	1107	16.2	52.8	10.6		
	127	TORN	47	GB	1056.8	1057.7	1.3	600	250		
	1470	POTS	40	F	1100	1136.5	70	8			
	606	SGMR	1	S	1105.9	1107	1.9	4.5	1.4		
	2695	SGMR	1	S	1105.9	1107	1.9	4.9	1.5		
	3000	POTS	22	F	1105	1134.5	63	7.5			
	1415	SGMR	1	S	1106	1106.9	1.9	5.5	1.6		
	2695	PENT	1	S	1106	1107	2	2.4	1		
	9500	POTS	20		1113	1145	47	7.6			
	2695	PENT	21	GRF	1130	1136	35	2.4	1.2		
	245	SGMR	6	S	1131	1134	18	204.4	40.9		
	410	SGMR	6	S	1131.5	1133.9	15.9	15.9	3.2		
	2695	SGMR	2	S/F	1131.8	1134.6	7	8.5	2.6		
	606	SGMR	2	S/F	1132	1134.3	3.5	6	1.8		
	1415	SGMR	2	S/F	1132.2	1136.5	4.6	7.6	2.3		
	237	TRST	42	SER	1133.8	1134.5	6.2	240			0
	2695	PENT	40	F	1134.2	1134.7	3	4.8			
	2695	PENT	40	F	1305	1313	13	17.4			
	18	MCMA	42	SER	1432	1440	22			2	
	18	MCMA	6	S	1535	1540	7			3	
	18	MCMA	4	F	1600	1606	10			2	
7	100	HIRA	45	C	0031	0031.2	1	900	250		WR
	2695	MANI	4		0154.5	0159.3	5.8	15.3	5.1		
	606	MANI	4		0154.5	0159.6	6	31.7	8.8		
	1415	MANI	4		0154.5	0159.3	5.8	61	6.9		
	4995	MANI	4		0154.5	0159.7	5.8	54	19.4		
	9400	TYKW	45	C	0154	0159.2	13	18	4		OL
	9400	TYKW			0154	0156.4		7			
	3750	TYKW	45	C	0154	0159.6	13	105	3 D		15L
	3750	TYKW			0154	0155.5		5			
	3750	TYKW			0154	0159.3		18			
	2000	TYKW	45	C	0154	0159.1	6	18	4		WR
	2000	TYKW			0154	0156		16			
	2000	TYKW	29	PBI	0200		15	2	1		
	1000	TYKW	45	C	0155 E	0159.3	7 D	375 U	15 D		WR
	1000	TYKW			0155 E	0156.2		21			
	1000	TYKW			0155 E	0159.5		54			
	500	HIRA	45	C	0156.3	0156.5	0.5	90	25		WL
	8800	MANI	4		0158.5	0200	3	12.6	2.5		
	500	HIRA	45	C	0158.6	0159.3	1.4	170	80		WL
	100	HIRA	45	C	0158.7	0159	1	1180	500		WL
	200	HIRA	45	C	0158.8	0158.8	0.5	520	130		WL
	100	GORK	44	NS	0306 E		354 D		50		
	200	GORK	44	NS	0306 E		414 D		10		
	100	HIRA	43	NS	0430	0619	300 D	240	70		SL
	127	TORN	44	NS	0540 E	1331.8	560 D	200			
	260	ONDR	44	NS	0620 E		550 D	125			
	221	ABST	44	NS	0700	0856	120	9			
	536	ONDR	43	NS	0900		410 D	36	9		
	606	SGMR	44	NS	0946 E	1454.3	845 D	43.4			
	245	SGMR	44	NS	0946 E	1741.2	845 D	618.9			
	410	SGMR	44	NS	0946 E	1512.5	845 D	102			
	200	HIRA	44	NS	1950 E	2214	820 D	120	25		SL
	100	HIRA	44	NS	1950 E	0559	820 D	210	38		SL
	207	VORO	44	NS	2100	2218	360	80			
	606	MANI	4		0450	0452.9	5.7	10.2	1.6		
	606	MANI	40		0516.8	0520.6	6.2	53	1.6		
	127	TORN	45	C	0556	0558.2	8	250	140		
	127	TORN	27	RF	0721.5	0723	5	145	50		
	9240	ARCE	20	GRF	0732.8	0927.3	290				
	127	TORN	8	S	0751.8	0752.2	0.8	55	20		
	950	GORK	6	S	0842.1	0842.3	0.5	11	5		
	234	POTS	45	C	1001.6	1001.8	0.4	350	35		
	408	TRST	27	RF	1026	1047.8	35	49			
	808	ONDR	45	C	1124.4	1124.4	3	48	4		
	245	SGMR	6	S	1124.4	1124.8	3.7	242.3	48.5		
	408	TRST	42	SER	1124.5	1126.1	5	56			
	237	TRST	42	SER	1124.6	1124.8	1.7	670			9R
	606	SGMR	4	S/F	1124.6	1126.2	3.1	57.8	17.3		
	234	POTS	45	C	1124.6	1124.8	0.3	300	25		
	410	SGMR	6	S	1124.7	1126.2	5.3	26.5	8		
	930	BORD	46	C	1124.8	1125	2.8	78	3		
	127	TORN	47	GB	1125	1126.4	4.2	520	150		

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

AUGUST 1976

AUG 1976	FREQUENCY	STATION	TYPE		STARTING TIME	TIME OF MAXIMUM	DURATION	FLUX DENSITY $10^{-22} Wm^{-2} Hz^{-1}$		INT	POLARIZATION OR REMARKS
					UT	UT	MINUTES	PEAK	MEAN		
	127	TORN			1125	1125.3	0.8	700 D	400		
	1415	SGMR	1	S	1125.6	1125.9	1	8.6	2.3		
	7000	SAOP	40	F	1300		240				
	245	SGMR	6	S	1304.4	1304.5	.4	64.2	6.4		
	606	SGMR	4	S/F	1304.5	1304.6	.2	16.7	5		
	237	TRST	41	F	1304.5	1304.6	0.3	170			7R
	410	SGMR	6	S	1304.6	1304.8	.4	4.1	1.2		
	18	MCMA	6	S	1336	1337	2			1	
	237	TRST	5		1338.5	1338.5	0.1	130	39		1L
	808	ONDR	41	F	1425.3	1451.6	56	38	21		
	9240	ARCE	21	GRF	1534.1	1540.4	11				
	245	SGMR	6	S	1536	1536.5	1	111.7U	22.3U		
	606	SGMR	2	S/F	1536.2	1536.7	1.3	8.4U	2.5U		
	9240	ARCE	2	S/F	1536.6	1537.1	1.6				
	7000	SAOP	1	S	1819.3	1819.6	1.4	2.4	1.2		
	500	HIRA	26	FAL	1950 E	2035	240 D	20	5		HL
	100	HIRA	45	C	2135	2141.7	9	1200	350		HL
	1000	TYKW	45	C	2137	2138.1	2.5	1.1	0.2		OR
	1000	TYKW	45	C	2140.5	2141.4	2.5	12	2.5		25R
	2000	TYKW	5	S	2140.5	2141.2	2.5	1.4	0.5		OR
	606	SGMR	4	S/F	2140.6	2141.3	1.7	41.3	12.4		
	245	SGMR	6	S	2140.6	2140.9	1.4	108	21.6		
	410	SGMR	6	S	2140.8	2141.5	1.6	52.4	10.5		
	9400	TYKW	5	S	2140	2141.4	4	7	2		OL
8	100	HIRA	45	C	0208.2	0209	1.5	1100	650		HL
	100	HIRA	45	C	0212	0213.5	6	350	50		HL
	200	GORK	44	NS	0303 E		237		40		
	100	GORK	44	NS	0304 E		356 D		25		
	127	TORN	44	NS	0540 E	1041.8	550 D	360			
	200	GORK	44	NS	0700		174 D		5		
	260	CNDR	44	NS	0705 E		491 D	44			
	100	HIRA	44	NS	1950 E	2029	820 D	35	12		SL
	200	HIRA	44	NS	1950 E	2119	820 D	14	3		SL
	207	VORO	44	NS	2100	2113	360	18			
	127	TORN	48	C	0542 U	0555.7	50	600			
	127	TORN	45	C	0628	0629	4.3	920	250		
	100	HIRA	45	C	0640	0640.9	2.5	600	200		SL
	100	HIRA	45	C	0729.5	0730.1	1	600	230		HL
	808	ONDR	8	S	0841.7	0841.7	0.3	50			
	9240	ARCE	2	S/F	0841.8	0842.3	1				
	9240	ARCE	29	PBI	0842.8		8.5				
	2950	GORK	1	S	0842	0842.4	0.6	3.6	1.6		
	930	BORD	46	C	0842	0842.5	0.7	25	3		
	127	TORN	46	C	0851	0854.7	9	320			
	127	TORN	8	S	0929.8	0920.5	1.5	200	70		
	245	SGMR	44	NS	0947 E	1054.6	843 D	72.4			
	410	SGMR	44	NS	0947 E	1400.2	843 D	5.7			
	18	MCMA	42	SER	1540	1643	77			2	
	18	MCMA	42	SER	1716	1717	12			2	
	100	HIRA	45	C	2024	2026.4	4	700	150		SL
9	200	GORK	44	NS	0300 E		420 D		5		
	100	GORK	44	NS	0300 E		420 D		5		
	221	ABST	44	NS	0500	0722	240	6			
	260	ONDR	44	NS	0650 E		512 D	40			
	127	TORN	43	NS	0657 U	1040	480 D	160			
	245	SGMR	44	NS	0948 E	1537.5	552 D	52.7			
	410	SGMR	44	NS	0948 E	1257	552 D	24.8			
	237	TRST	41	F	1024.3	1024.4	0.2	390			9R
	127	TORN			0657 U	1144.7		380			
	237	TRST	41	F	0721.9	0722	0.3	750			17R
	234	POTS	45	C	0722	0722	0.1	350	100		
	127	TORN	45	C	0915.8	0916.9	2.5	190	45		
	127	TORN	45	C	0956	0957	2	120			
	18	MCMA	42	SER	1620	1701	206			2	
	18	MCMA	42	SER	1953	1955	14			1	
	200	HIRA	44	NS	1955 E	0123	815 D	50	18		SL
	207	VORO	44	NS	2100	0019	360	56			
10	200	GORK	44	NS	0300 E		420 D		15		
	100	GORK	44	NS	0300 E		420 D		5		
	221	ABST	44	NS	0500	0533.5	240	13			
	260	ONDR	44	NS	0626 E		534 D	51			
	127	TORN	44	NS	0740 E		440 D				
	177	DWIN	44	NS	0947		348 D	70	30		
	169	DWIN	44	NS	0947		348 D	120	30		
	160	DWIN	44	NS	0947		348 D	150	20		
	221	ABST	45	C	0732	0733	2	41	25		
	9240	ARCE	1	S	0749.5	0749.7	1.4				
	127	TORN	7	C	1140.7	1142.3	4	35	10		
	536	ONDR	8	S	1356.8	1356.8	0.3	39			
	245	SGMR	44	NS	1700 E	1930.3	407 D	61.6			
	410	SGMR	44	NS	1700 E	2237.3	407 D	22.4			
	200	HIRA	44	NS	1955 E	2038	815 D	38	14		SL

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

AUGUST 1976

AUG 1976	FREQUENCY STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	MEAN	INT	POLARIZATION OR REMARKS
	207 VORO	44 NS	2200	2245	300	26			
11	200 GORK	44 NS	0312 E		408 D		10		
	100 GORK	43 NS	0312 E		342 D		5		
	221 ABST	44 NS	0500	0832	240	6			
	260 ONDR	44 NS	0540 E		568 D	50			
	127 TORN	44 NS	0540 E		560 D				
	160 DWIN	44 NS	0817		418 D	30	5		
	240 DWIN	44 NS	0817		418 D	10	5		
	177 DWIN	44 NS	0817		418 D	30	5		
	169 DWIN	44 NS	0817		418 D	30	5		
	245 SGMR	44 NS	0950 E	1640.2	836 D	186.8			
	410 SGMR	44 NS	0950 E	1314.4	836 D	13.3			
	200 HIRA	44 NS	1955 E	0316	815 D	24	3		SL
	207 VORO	44 NS	2100	2357	360	16			
	2800 OTTA	32 ABS	1408	1432	55	-1.2	-0.6		
12	100 GORK	44 NS	0300 E		600 D		5		
	200 GORK	44 NS	0303 E		597 D		7		
	221 ABST	44 NS	0500	0644	240	8			
	260 ONDR	44 NS	0635 E		515 D	57			
	160 DWIN	44 NS	0903		358 D	10	2		
	253 DWIN	44 NS	0903		358 D	20	5		
	240 DWIN	44 NS	0903		358 D	20	5		
	169 DWIN	44 NS	0903		358 D	20	2		
	245 SGMR	44 NS	0951 E	2002	834 D	161			5
	410 SGMR	44 NS	0951 E	2043.3	834 D	56.9			5
	200 HIRA	44 NS	1955 E	2022	540 D	22	2		SL
	207 VORO	44 NS	2100	0207	360	35			
	237 TRST	41 F	1421.9	1423.4	0.7	140			14R
	18 MCMA	4 F	1503	1504	18			1	
13	200 GORK	44 NS	0303 E		99		5		
	700 SYON	40 F	0422.3	0429.1	13.6				
	260 ONDR	44 NS	0638 E		508 D	27			
	100 GORK	43 NS	0800		60		5		
	245 SGMR	44 NS	0952 E	1204.2	831 D	24			
	200 GORK	44 NS	1100		120		5		
	160 DWIN	43 NS	1146		200 D	20	5		
	177 DWIN	43 NS	1146		200 D	20	5		
	169 DWIN	43 NS	1146		200 D	20	5		
	127 TORN	43 NS	1147 U	1239	180 D	75			
	410 SGMR	43 NS	1149.7	1548.2	713.3D	31.4			
	100 GORK	43 NS	1200		60 D		5		
	127 TORN	40 F	0740 E	0921.7	150 D	9			
	127 TORN		0740 E	0955		10			
	3000 POTS	20	1143	1150	23	2.7			
	9240 ARCE	22 GRF	1145.2	1151.2	22				ATMOS ATTEN
	9500 POTS	22 F	1145	1151	13	13			
	2695 PENT	21 GRF	1145	1230	130	1.4	1		
	253 DWIN	45 C	1148	1148.5	1	70	5		
	240 DWIN	45 C	1148	1148.5	1	35	5		
	1470 POTS	20	1148	1150	10	2.1			
	2695 PENT	1 S	1148	1152	6	2	1.5		
	127 TORN	45 C	1149	1149.5	2.5	15	4		
	2695 PENT	22 GRF	1420	1440	210	2.8	2		
	9240 ARCE	20 GRF	1422.2	1440.2	41				
	253 DWIN	45 C	1428	1429	6	35	5		
	240 DWIN	45 C	1428	1429	6	15	5		
14	260 ONDR	44 NS	0635 E		139	29			
	9240 ARCE	2 S/F	0934.4	0934.6	0.8				ATMOS ATTEN
	207 VORO	44 NS	2100	0015	360	12			
15	260 ONDR	44 NS	0637 E		528 D	17			
16	1420 BOUL	1 S	1612.5	1613.5	2.5	1			
	207 VORO	44 NS	2223	2354	277	11			
17	200 GORK	44 NS	0300 E		390		5		
	100 GORK	46 S	0355.9	0356	0.6	120	60		
	100 GORK	6 S	0441.7	0443.2U	3.8	400			
	200 GORK		0441.9	0443.4U		135			
	200 GORK	41 F	0441.9	0442	2.3	135			
	260 ONDR	44 NS	0639 E		509 D	18			
	9240 ARCE	1 S	1210.3	1210.5	0.5				
	3100 CRIM	24 R	1221	1300 U	39 D	2.5	1		
18	200 GORK	44 NS	0306 E		594 D		5		
	221 ABST	41 F	0614	0615	1	10			
	260 ONDR	44 NS	0640 E		511 D	10	1		
	127 TORN	43 NS	0936 U	0953.4	320 D	28			
	100 GORK	43 NS	1009		171 D		5		
	3100 CRIM	20 GRF	0630	0715	165	2	1		
	2800 OTTA	20 GRF	1426	1430	25	1.4	0.7		

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES
AUGUST 1976

AUG 1976	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY $10^{-22} Wm^{-2} Hz^{-1}$ PEAK	FLUX DENSITY MEAN	INT	POLARIZATION OR REMARKS
	1420	BOUL	8 S	1842.5	1844.5	12.5	99	33		
	2800	OTTA	3 S	1843.5	1844.7	4.5	32	8		
	2695	SGMR	3 S	1843.7	1844.7	5.8	33.7	10.1		
	7000	SAOP	28 PRE	1843 E	1843.7	0.7D	9.2	4.6U		
	7000	SAOP	4 S/F	1843.7	1844	1.5	57.3	26.8		
	7000	SAOP	29 PBI	1845.2	1845.2	2.2	4.4	2.2		
	4995	SGMR	3 S	1843.8	1844.9	5	36	10.8		
	1415	SGMR	4 S/F	1843.8	1844.9	4.9	94.3	28.3		
	245	SGMR	49 GB	1843.9	1846.4	13.9	1557.9	311.6		
	606	SGMR	47 GB	1844	1845	6.7	621.8	186.5		
	410	SGMR	48 C	1844.1	1844.9	7.2	542.4	108.5		
	8800	SGMR	3 S	1844.4	1844.8	1.5	41.6	12.5		
	15400	SGMR	3 S	1844.5	1844.8	3	20.4	6.1		
	2695	BOUL	8 S	1844	1845	4.5	28	9		
	2695	BOUL	31 ABS	1848.5	1850.5	14.5	2	1		
	2800	OTTA	31 ABS	1848	1905	87	-1			
	18	MCMA	6 S	1848	1850	3			1	
	4995	BOUL	8 S	1852.5	1854.5	3.5	26	9		
19	3100	CRIM	1 S	0906	0907	2	3	1		
	127	TORN	5 S	0914	0914.3	2	30	10		
	237	TRST	41 F	1201	1201.1	0.3	46			1R
20	9240	ARCE	1 S	1314.6	1314.9	1.2				
21	2695	PENT	1 S	1118.5	1121	5	2	1.2		
	2695	PENT	22 GRF	1308	1310	12	1.2	0.6		
22	808	ONDR	45 C	1153.3	1159.6	16.5	68	9.7		
	260	ONDR	46 C	1153.8	1201.3	40	33	7.8		
	260	ONDR		1153.8	1158.3		20			
	260	ONDR		1153.8	1205		24			
	536	ONDR	45 C	1155.8	1200.3	14	9	6.4		
	3000	POTS	46 F	1156.5	1211.5	67	115			
	1470	POTS	46 F	1158	1211.8	58	50			
	2695	SGMR	46 C	1158.4	1207.6	54.7	129.4	42.4		
	2695	PENT	46F C	1158	1211.5	32	152			
	2695	PENT	29 PBI	1230	1230	58	7.4	2.5		
	237	TRST	47 GB	1159	1206.2	22	20			0
	228	HARS	46 C	1159.2	1206.2	15.8	60	27		
	4995	SGMR	46 C	1159.4	1205.3	53.6	156.2	51.2		
	9240	ARCE	46 C	1159.5	1207.9	18.9				
	9240	ARCE		1159.5	1201.3	3.2				
	9240	ARCE		1202.7	1205.7	4.2				
	9240	ARCE		1206.9	1207.9	3.3				
	9240	ARCE		1210.2	1211.5	8.2				
	9240	ARCE	29 PBI	1218.4		48				
	8800	SGMR	46 C	1159.6	1205.6	32.5	111.8	39.4		
	245	SGMR	6 S	1200.6	1205.9	15.1	40	8		
	15400	SGMR	46 C	1200.7	1205.5	23.9	58.5	18.3		
	410	SGMR	6 S	1200.8	1203	13.6	22.1	4.4		
	9500	POTS	45	1200	1207.8	100	90			
	408	TRST	47 GB	1201	1202.7	10.6	25			
	127	TORN	49 GB	1201.5	1202.3	24 U	1700 D	50		
	127	TORN		1201.5	1205	6.5	1000 D	250		
	127	TORN		1201.5	1224.1		500 D			
	234	POTS	45 C	1203.2E	1203.4	6.4D	4000			
	15400	SGMR	46 C		1207.6		61			
	8800	SGMR	46 C		1207.8		131.2			
	4995	SGMR	46 C		1207.4		170.8			
	2695	SGMR	46 C		1211.4		141.4			
23	700	SYDN	42 SER	0108	0109	173.4				
	9240	ARCE	2 S	1325.5	1325.7	0.6				
26	2695	BOUL	3 S	1657.5	1659.5	2	12	4		
	4995	BOUL	8 S	1701.5	1702.5	2.5	14	5		
	2695	BOUL	1 S	1733.5	1734	1.5	3	1		
27	260	ONDR	43 NS	0640		506 D	17			
	9240	ARCE	4 S/F	1245	1245.2	0.8				RECORD DIST
	9240	ARCE	22 GRF	1441.2	1611	107				
	9240	ARCE	1 S	1628.7	1628.9	0.7				
	9240	ARCE	3 S	1709 U	1711.4	3.3				ATMOS SCINT
	18	MCMA	6 S	2246	2247	2			1	
	207	VORO	44 NS	2328	0016	212	12			
28	221	ABST	6 S	0629	0629.5	1	20			
	260	ONDR	44 NS	0650 E		530 D	9			
	221	ABST	41 F	0751.2	0751.5	1	11			
	207	VORO	44 NS	2238	0022	262	15			
29	200	GORK	43 NS	0312		72		5		
	260	ONDR	44 NS	0646 E		476 D	18			
	200	GORK	44 NS	0721		159		5		

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES
AUGUST 1976

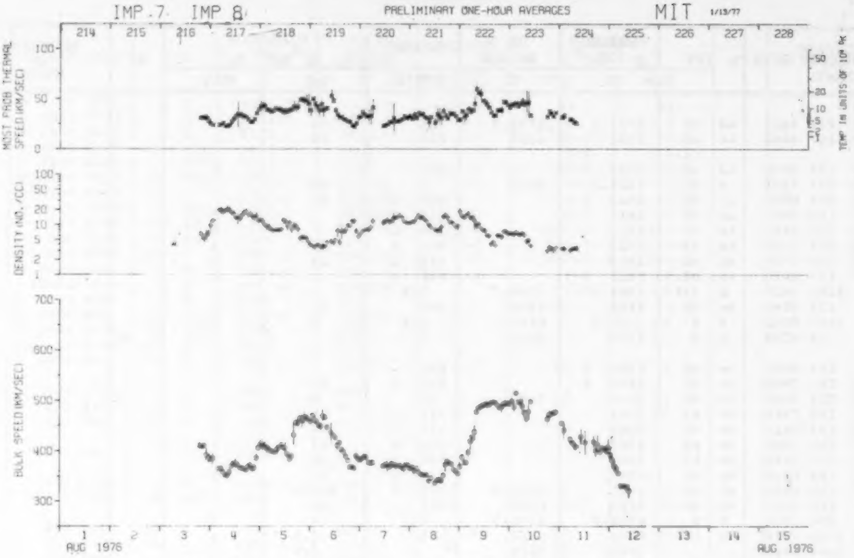
AUG 1976	FREQUENCY STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY $10^{-22} Wm^{-2} Hz^{-1}$ PEAK	FLUX DENSITY MEAN	INT	POLARIZATION OR REMARKS
	221 ABST	43 NS	0721.2	0731.8	25	10			
	207 VORO	44 NS	2100	0002	360	25			
30	200 GORK	43 NS	0309		591		5		
	221 ABST	6 S	0618.8	0619	1	28			
	260 ONDR	44 NS	0640 E		508 D	57			
	169 DWIN	44 NS	0813		400 D		2		
	160 DWIN	44 NS	0813		400 D		2		
	253 DWIN	44 NS	0813		400 D	20	3		
	240 DWIN	44 NS	0813		400 D	20	2		
	177 DWIN	44 NS	0813		400 D		2		
	9240 ARCE	2 S/F	1308.5	1308.7	0.9				
	207 VORO	44 NS	2100	2355	360	21			
	1420 BOUL	8 S	2109.5	2110.5	1.5	2	1		
	18 MCMA	6 S	2316	2318	5			1	
31	200 GORK	44 NS	0323 E		537		5		
	260 ONDR	44 NS	0639 E		512 D	14			
	221 ABST	43 NS	0644	0649	32	9			
	160 DWIN	44 NS	0900		338 D	10	3		
	253 DWIN	44 NS	0900		338 D	30	7		
	240 DWIN	44 NS	0900		338 D	40	5		
	176 DWIN	44 NS	0900		338 D	10	5		
	169 DWIN	44 NS	0900		338 D	10	5		
	245 SGMR	43 NS	1405	1516.9	550 D	144.8			3
	207 VORO	44 NS	2200	2238	120	24			
	200 GORK	8 S	0346.2	0346.5	3.2	30			
	3100 CRIM	46 C	0621	0622	5	3.5	1		
	3100 CRIM		0621	0625		3.5			
	3100 CRIM	1 S	0639	0639	1	2.5	1		
	200 GORK	8 S	0654.9	0655	2.1	30			
	9240 ARCE	21 GRF	0748.8	0757.4U	130 U				RECORD DIST
	9240 ARCE	45 C	0817 U	0822.3	43 U				ATMOS ATTEN
	9240 ARCE		0817 U	0822.3	6.1U				
	9240 ARCE		0823.1U	0825.8	36.9U				
	127 TORN	41 F	1118	1129	12	23			
	18 MCMA	6 S	1730	1733	4			1	
	18 MCMA	6 S	2331	2332	2			1	

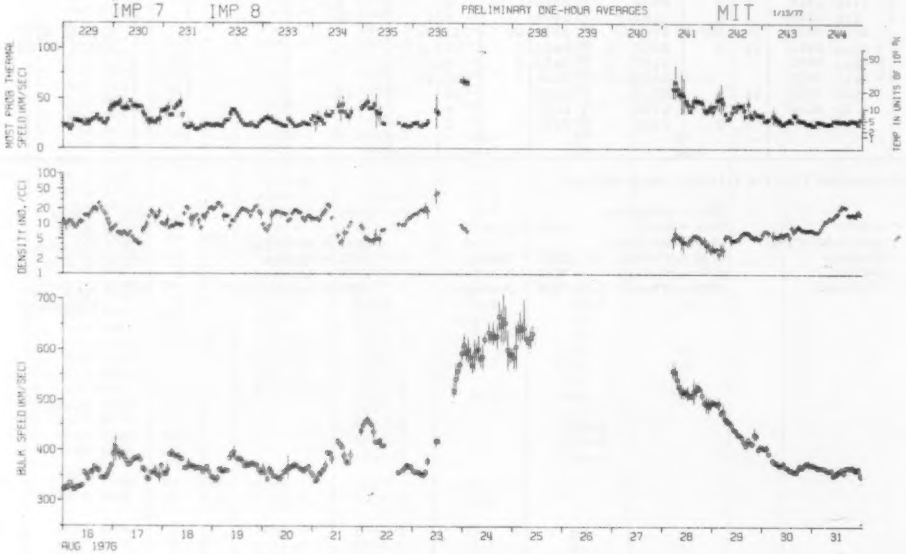
Reports received from the following observatories:

ARCE = Arcetri
BERL = Berlin-Adlershof
BORD = Bordeaux
BOUL = Boulder
CRIM = Simferopol
DWIN = Dwingeloo
GORK = Gorky
HARS = Harestua
HIRA = Hiraiso
HUAN = Huancayo
IRKU = Irkutsk
KIEV = Kiev
MANI = Manila
MCMA = McMath-Hulbert
ONDR = Ondrejov
OTTA = Ottawa
PENT = Penticton
POTS = Potsdam
SAOP = Sao Paulo
SGMR = Sagamore Hill
SYDN = Sydney
TORN = Torun
TYKW = Toyokawa
TRST = Trieste
VORO = Voroshilov (Ussurisk)

IMP 7 AND 8 SOLAR WIND PLASMA

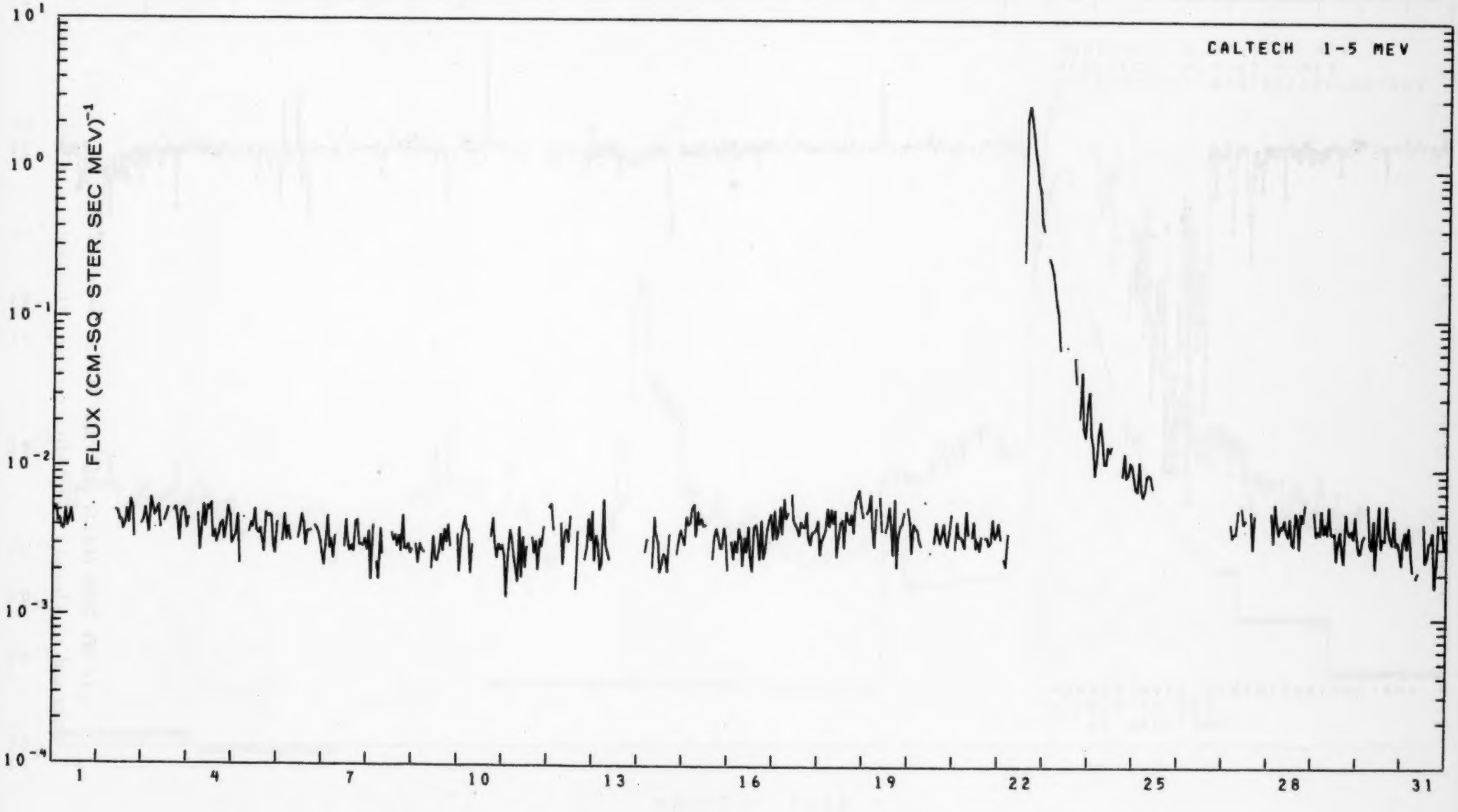
AUGUST 1976





IMP 7 AND 8 ELECTRONS

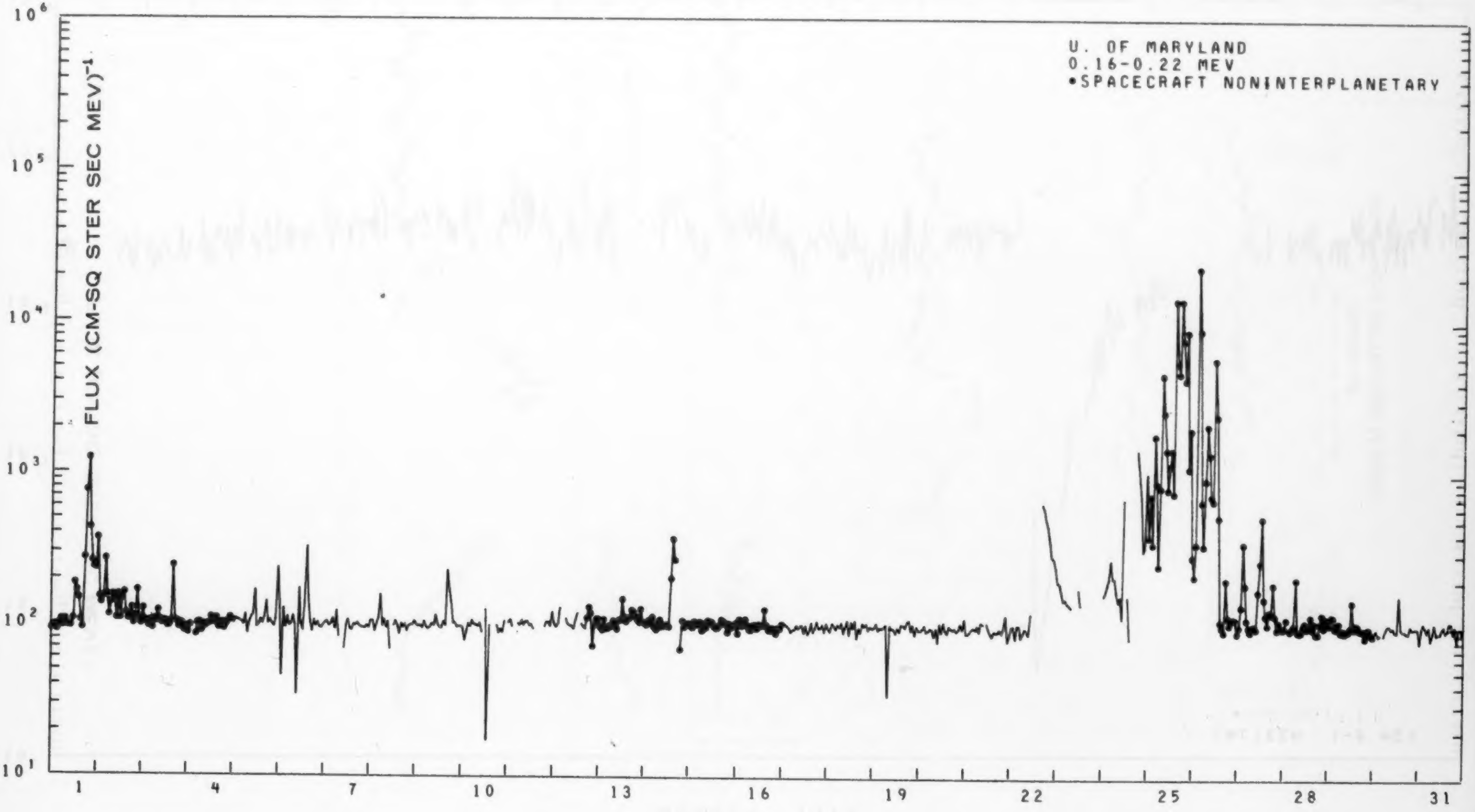
AUGUST 1976



23
Aug 76

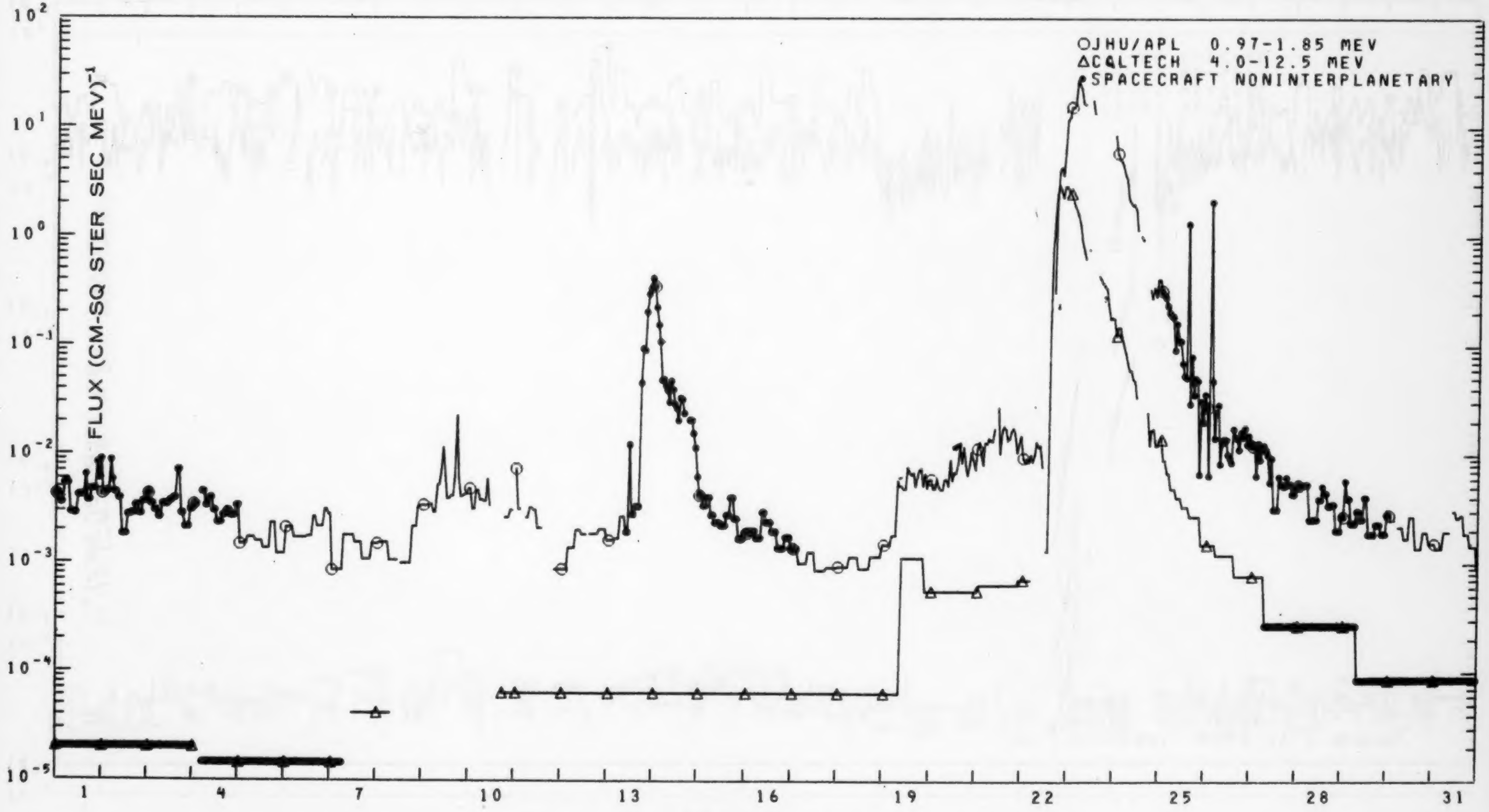
IMP 7 AND 8 LOW ENERGY PROTONS

AUGUST 1976



IMP 7 AND 8 INTERMEDIATE ENERGY PROTONS

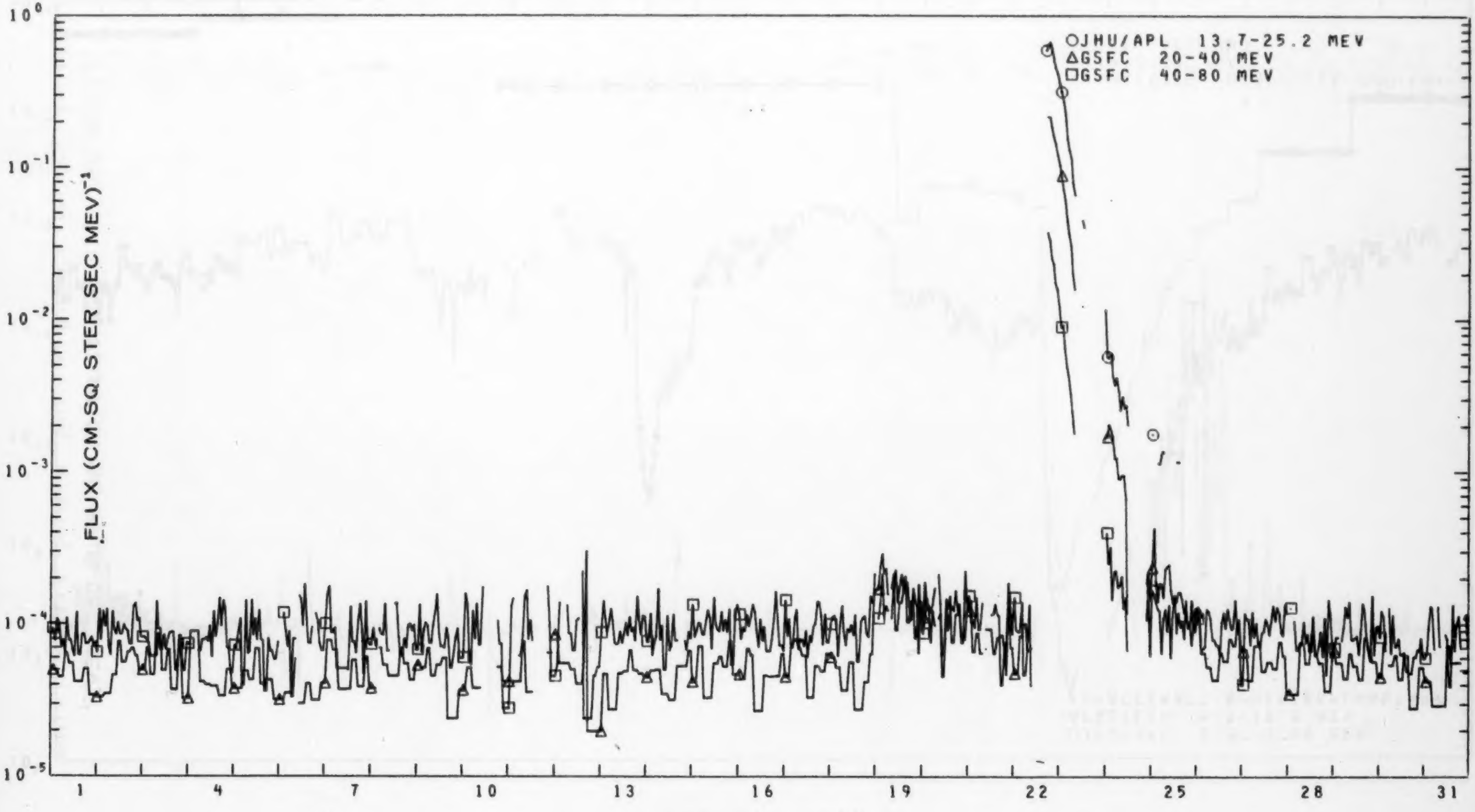
AUGUST 1976



25
Aug 76

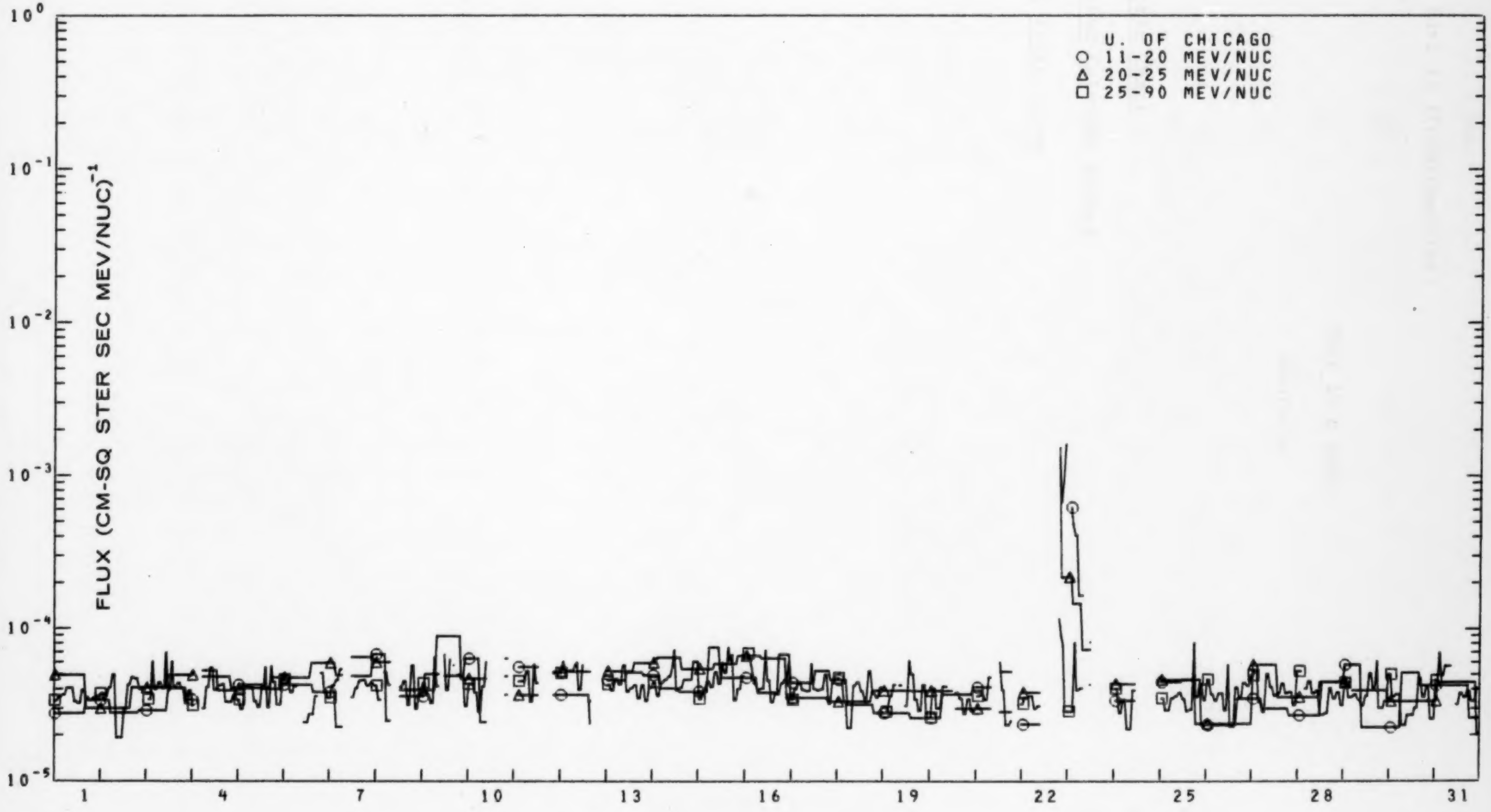
IMP 7 AND 8 HIGH ENERGY PROTONS

AUGUST 1976



IMP 7 AND 8 ALPHA PARTICLES

AUGUST 1976



JULY 1976 DATA

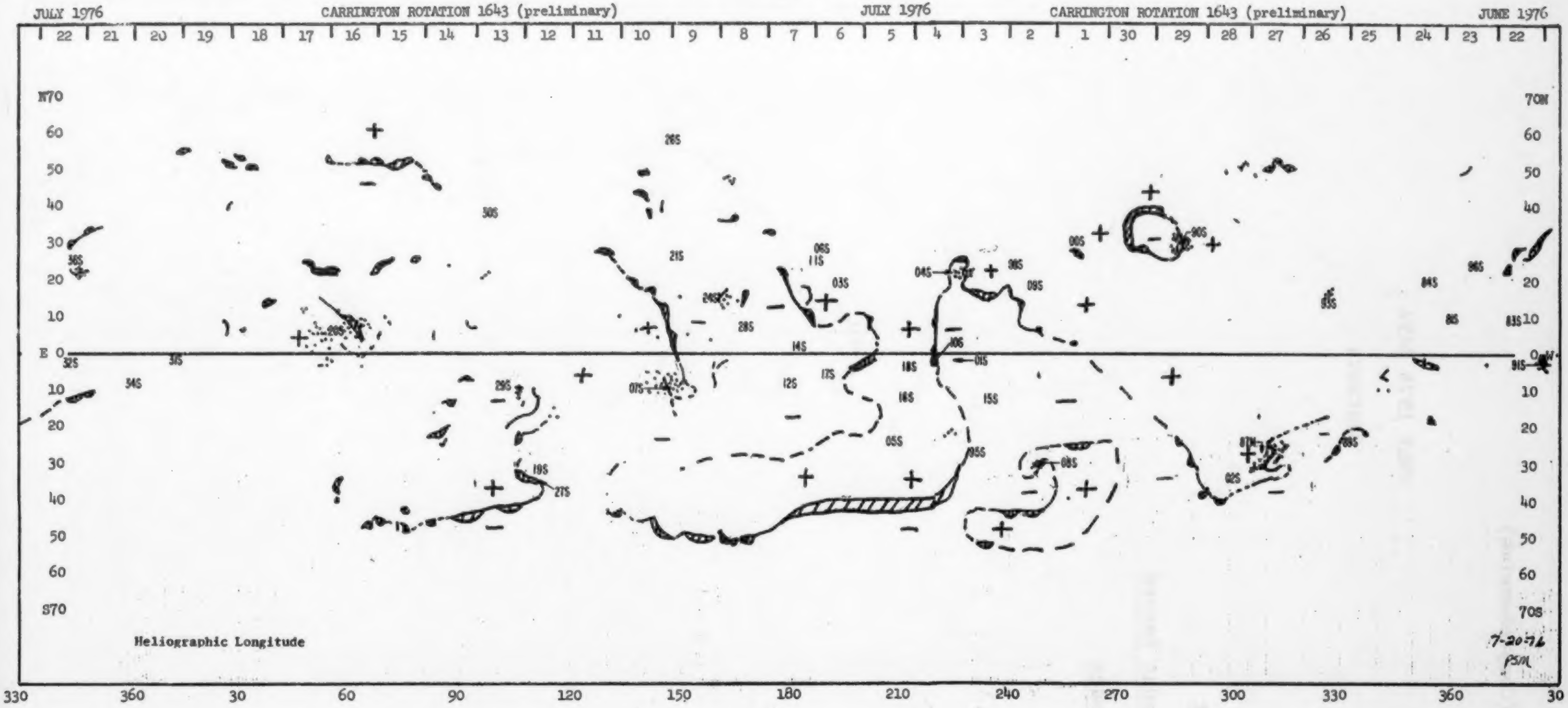
Contents

	Page
Hα Synoptic Chart	30-31
Abbreviated Calendar Record	32-39
Regional Flare Index	39

ABBREVIATED CALENDAR RECORD

Hα SYNOPTIC CHART

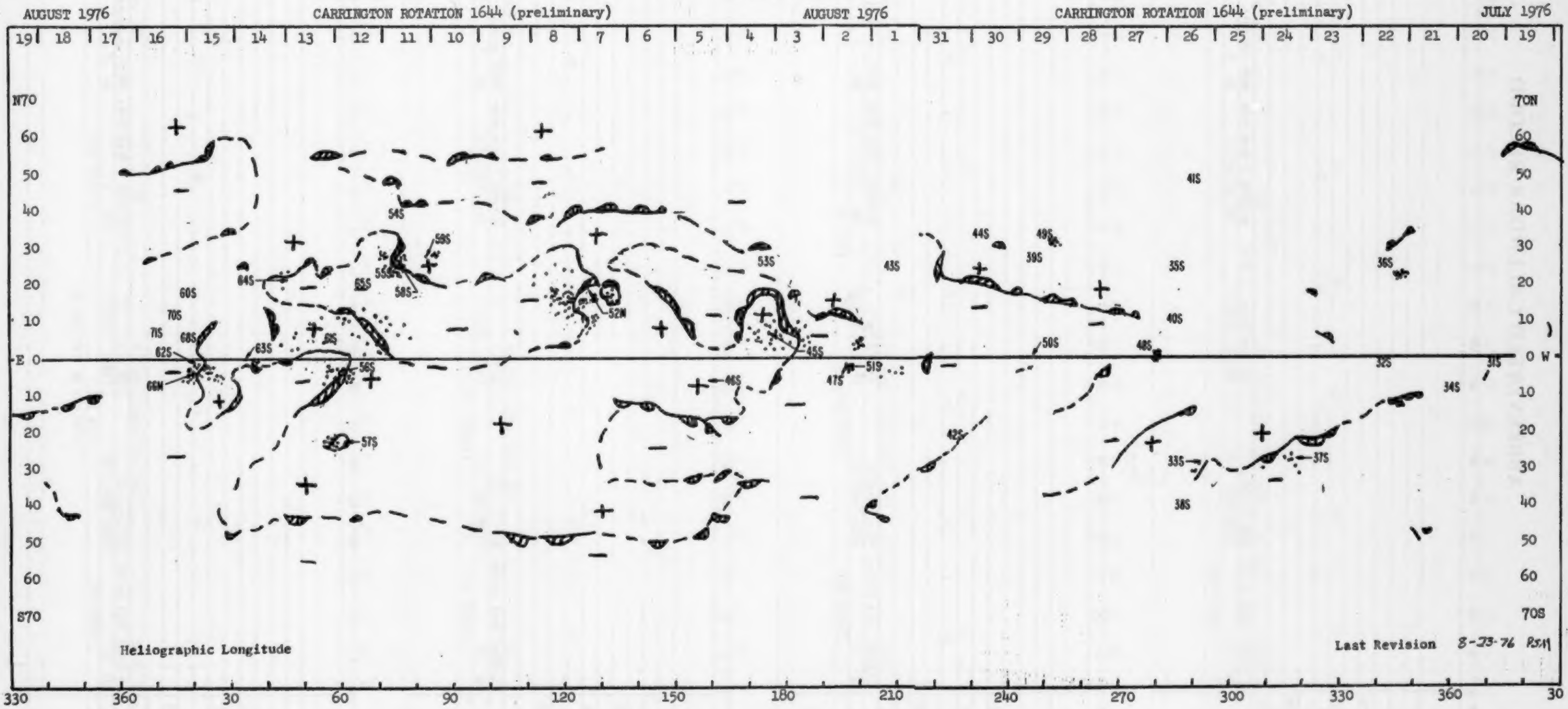
JULY 1976



ABBREVIATED CALENDAR RECORD

Hα SYNOPTIC CHART

AUGUST 1976



ABBREVIATED CALENDAR RECORD

July 1, 1976

FLARES
Bursts: cm, dm, m, Dkm
SID
X-Rays
Ap 1803* — Kp: 3+ | 5- | 3+ | 4o | 3- | 3- | 2o | 2o
sc
Aurora: USSR, W.E.
Cosmic Rays
Green Corona: E. Limb 7 days earlier: NE- no data; SE- no data; W. Limb 7 days later: NW- no data; SW- no data
Indices: Rz: 9; 10 cm flux: 67; Flare: 0/22.4; Ca: 1.5; Ip: 0; Ia: 5
Solar Regions: (14300) N29
Sunspots

July 2, 1976

FLARES
Bursts: cm, dm, m, Dkm
SID
X-Rays
Ap 9 — Kp: 3o | 2- | 2+ | 2+ | 3- | 2+ | 2- | 2-
sc
Aurora: USSR, W.E.
Cosmic Rays
Green Corona: E. Limb 7 days earlier: NE- no data; SE no data; W. Limb 7 days later: NW- no data; SW- no data
Indices: Rz: 8; 10 cm flux: 67; Flare: 0/21.7; Ca: 1.7; Ip: 0; Ia: 2
Solar Regions: (14308) S31; (14309) N18; (14298) N24
Sunspots

July 3, 1976

FLARES
Bursts: cm, dm, m, Dkm
SID
X-Rays
Ap 12 — Kp: 1o | 3o | 3- | 3+ | 2+ | 3+ | 2- | 3o
sc
Aurora: USSR, W.E.
Cosmic Rays
Green Corona: E. Limb 7 days earlier: NE-; SE-; W. Limb 7 days later: NW- no data; SW- no data
Indices: Rz: 14; 10 cm flux: 67; Flare: 0/22.1; Ca: 1.4; Ip: 0; Ia: 2
Solar Regions: (14315) S12; (14295) S27 (2)
Sunspots

July 4, 1976

FLARES
Bursts: cm, dm, m, Dkm
SID
X-Rays
Ap 14 — Kp: 2o | 2o | 4- | 3+ | 3o | 3+ | 4- | 1+
sc
Aurora: USSR, W.E.
Cosmic Rays
Green Corona: E. Limb 7 days earlier: NE-; SE; W. Limb 7 days later: NW- no data; SW- no data
Indices: Rz: 8; 10 cm flux: 66; Flare: 0/23.6; Ca: 2.0; Ip: 0; Ia: 5
Solar Regions: (14301) S01; 14304 N22; (14310) S03
Sunspots: 19701 N21 Bp CMP July 3

July 5, 1976

Hours (UT)	00–03	03–06	06–09	09–12	12–15	15–18	18–21	21–24
FLARES								
Bursts cm								
Bursts dm								
Bursts m								
Bursts Dkm								
SID								
X-Rays								
Ap 6 Kp	1o	1+	2-	2-	2o	2o	1+	1+
sc								
Aurora USSR								
Aurora W.E.								
Cosmic Rays								

Green Corona	E. Limb 7 days earlier: NE- ; SE- ; W. Limb 7 days later: NW- no data ; SW- no data
Indices	Rz: 8 ; 10 cm flux: 67 ; Flare: 0/24.0 ; Ca: 1.7 ; Ip: 0 ; Ia: 2
Solar Regions	(14318) S04 ; (14316) S12 ; (14305) S23
Sunspots	

July 6, 1976

Hours (UT)	00–03	03–06	06–09	09–12	12–15	15–18	18–21	21–24
FLARES								
Bursts cm								
Bursts dm								
Bursts m								
Bursts Dkm								
SID								
X-Rays								
Ap 6 Kp	3o	1+	2o	1+	1+	1o	1o	1o
sc								
Aurora USSR								
Aurora W.E.								
Cosmic Rays								

Green Corona	E. Limb 7 days earlier: NE- ; SE ; W. Limb 7 days later: NW- no data ; SW- no data
Indices	Rz: 10 ; 10 cm flux: 67 ; Flare: 0/21.9 ; Ca: 2.0 ; Ip: 0 ; Ia: 1
Solar Regions	(14303) N19 ; (14317) S06 ; (14306) N28 ; (14311) N26
Sunspots	

July 7, 1976

Hours (UT)	00–03	03–06	06–09	09–12	12–15	15–18	18–21	21–24
FLARES								
Bursts cm								
Bursts dm								
Bursts m								
Bursts Dkm								
SID								
X-Rays								
Ap 9 Kp	3o	3-	1+	3o	2-	2-	1-	2+
sc								
Aurora USSR								
Aurora W.E.								
Cosmic Rays								

Green Corona	E. Limb 7 days earlier: NE- no data ; SE- no data ; W. Limb 7 days later: NW- ; SW-
Indices	Rz: 7 ; 10 cm flux: 67 ; Flare: 0/23.6 ; Ca: 1.2 ; Ip: 0 ; Ia: 0
Solar Regions	(14314) N01 ; (14312) S08
Sunspots	

July 8, 1976

Hours (UT)	00–03	03–06	06–09	09–12	12–15	15–18	18–21	21–24
FLARES								
Bursts cm								
Bursts dm								
Bursts m								
Bursts Dkm								
SID								
X-Rays								
Ap 13 Kp	2-	3-	2+	2-	4-	3-	4o	3-
sc								
Aurora USSR								
Aurora W.E.								
Cosmic Rays								

Green Corona	E. Limb 7 days earlier: NE- ; SE ; W. Limb 7 days later: NW- ; SW-no data 225° and 230°
Indices	Rz: 0 ; 10 cm flux: 67 ; Flare: 0/22.8 ; Ca: 0.9 ; Ip: 0 ; Ia: 3
Solar Regions	(14328) N07
Sunspots	

July 9, 1976 (00–24 UT)

FLARES	
Bursts cm	
Bursts dm	
Bursts m	
Bursts Dkm	
SID	
X-Rays	
Ap 10 — Kp	3+ | 4- | 2- | 2+ | 2o | 2+ | 2- | 2-
sc	
Aurora USSR	
Aurora W.E.	
Cosmic Rays	
Green Corona	E. Limb 7 days earlier: NE- ; SE- ; W. Limb 7 days later: NW- no data ; SW- no data
Indices	Rz: 0 ; 10 cm flux: 67 ; Flare: 0/21.7 ; Ca: 0.7 ; Ip: 0 ; Ia: 0
Solar Regions	(14324) N15 ; (14321) N25 ; (14326) N58
Sunspots	

July 10, 1976 (00–24 UT)

FLARES	
Bursts cm	
Bursts dm	
Bursts m	
Bursts Dkm	
SID	
X-Rays	
Ap 6 — Kp	1+ | 2+ | 2o | 2o | 1o | 1o | 1+ | 1+
sc	
Aurora USSR	
Aurora W.E.	
Cosmic Rays	
Green Corona	E. Limb 7 days earlier: NE- no data ; SE no data ; W. Limb 7 days later: NW- no data ; SW- no data
Indices	Rz: 0 ; 10 cm flux: 68 ; Flare: 0/20.8 ; Ca: 0.5 ; Ip: 0 ; Ia: 0
Solar Regions	14307 S10
Sunspots	

July 11, 1976 (00–24 UT)

FLARES	
Bursts cm	
Bursts dm	
Bursts m	
Bursts Dkm	
SID	
X-Rays	
Ap 4Q3 — Kp	1o | 1o | 1o | 1o | 1- | 1o | 1+ | 1+
sc	
Aurora USSR	
Aurora W.E.	
Cosmic Rays	
Green Corona	E. Limb 7 days earlier: NE- ; SE- ; W. Limb 7 days later: NW- no data ; SW- no data
Indices	Rz: 0 ; 10 cm flux: 68 ; Flare: 0/23.1 ; Ca: 0.6 ; Ip: 0 ; Ia: 0
Solar Regions	
Sunspots	

July 12, 1976 (00–24 UT)

FLARES	
Bursts cm	
Bursts dm	
Bursts m	
Bursts Dkm	
SID	
X-Rays	
Ap 5Q10 — Kp	2o | 2- | 1o | 1- | 1+ | 1o | 1+ | 2o
sc	
Aurora USSR	
Aurora W.E.	
Cosmic Rays	
Green Corona	E. Limb 7 days earlier: NE- ; SE ; W. Limb 7 days later: NW- no data ; SW- no data
Indices	Rz: 0 ; 10 cm flux: 68 ; Flare: 0/19.5 ; Ca: 1.2 ; Ip: 0 ; Ia: 0
Solar Regions	(14319) S32 ; (14327) S34
Sunspots	

July 13, 1976

FLARES

Bursts: cm / dm / m / Dkm

SID

X-Rays

Ap 404	00–03	03–06	06–09	09–12	12–15	15–18	18–21	21–24
Kp	1+	1+	2-	1-	1o	1-	1-	1+
sc								

Aurora: USSR / W.E.

Cosmic Rays

Green Corona: E. Limb 7 days earlier: NE- SE-no data 120° and 175° W. Limb 7 days later: NW- no data SW- no data

Indices: Rz: 0 10 cm flux: 68 Flare: 2/21.3 Ca: 1.9 Ip: 0 Ia: 0

Solar Regions: (14329) S09 (14330) N38

Sunspots

July 14, 1976

FLARES

Bursts: cm / dm / m / Dkm

SID

X-Rays

Ap 6	00–03	03–06	06–09	09–12	12–15	15–18	18–21	21–24
Kp	1+	2o	2+	2o	2o	1+	1o	1-
sc								

Aurora: USSR / W.E.

Cosmic Rays

Green Corona: E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- SW-

Indices: Rz: 0 10 cm flux: 68 Flare: 1/24.0 Ca: 1.5 Ip: 0 Ia: 0

Solar Regions

Sunspots

July 15, 1976

FLARES

Bursts: cm / dm / m / Dkm

SID

X-Rays

Ap 1904*	00–03	03–06	06–09	09–12	12–15	15–18	18–21	21–24
Kp	2-	2-	2o	2o	2-	4+	6-	4-
sc								

Aurora: USSR / W.E.

Cosmic Rays

Green Corona: E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- no data SW- no data

Indices: Rz: 0 10 cm flux: 69 Flare: 1/23.6 Ca: 2.0 Ip: 0 Ia: 1

Solar Regions

Sunspots

July 16, 1976

FLARES

Bursts: cm / dm (ll ll, ~03–04 UT) / m / Dkm

SID

X-Rays

Ap 1605*	00–03	03–06	06–09	09–12	12–15	15–18	18–21	21–24
Kp	3o	3o	4+	3-	3o	3o	3+	2+
sc								

Aurora: USSR / W.E.

Cosmic Rays

Green Corona: E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- SW-

Indices: Rz: 0 10 cm flux: 68 Flare: 2/22.5 Ca: 2.0 Ip: 0 Ia: 2

Solar Regions: 14320 N05 (2)

Sunspots: N05

July 17, 1976

	00–03	03–06	06–09	09–12	12–15	15–18	18–21	21–24
FLARES								
Bursts cm								
Bursts dm								
Bursts m								
Bursts Dkm								
SID								
X-Rays								
Ap 5Q9 Kp	1+	2-	1o	1o	1o	1+	2-	2-
sc								
Aurora USSR								
Aurora W.E.								
Cosmic Rays								
Green Corona	E. Limb 7 days earlier: NE- no data	SE- no data	W. Limb 7 days later: NW- no data	SW- no data				
Indices	Rz: 0	10 cm flux: 67	Flare: 0/22.3	Ca: 1.1	Ip: 0	Ia: 0		
Solar Regions								
Sunspots								

July 18, 1976

	00–03	03–06	06–09	09–12	12–15	15–18	18–21	21–24
FLARES								
Bursts cm								
Bursts dm								
Bursts m								
Bursts Dkm								
SID								
X-Rays								
Ap 6 Kp	1+	2o	2o	0+	1-	1o	2+	2o
sc								
Aurora USSR								
Aurora W.E.								
Cosmic Rays								
Green Corona	E. Limb 7 days earlier: NE- no data	SE no data	W. Limb 7 days later: NW-	SW-				
Indices	Rz: 0	10 cm flux: 68	Flare: 0/23.1	Ca: 1.0	Ip: 0	Ia: 0		
Solar Regions								
Sunspots								

July 19, 1976

	00–03	03–06	06–09	09–12	12–15	15–18	18–21	21–24
FLARES								
Bursts cm								
Bursts dm								
Bursts m								
Bursts Dkm								
SID								
X-Rays								
Ap 6 Kp	3-	1o	2o	1o	1+	2-	1o	0+
sc								
Aurora USSR								
Aurora W.E.								
Cosmic Rays								
Green Corona	E. Limb 7 days earlier: NE- no data	SE- no data	W. Limb 7 days later: NW- no data	SW- no data				
Indices	Rz: 0	10 cm flux: 68	Flare: 0/21.5	Ca: 0.5	Ip: 0	Ia: 0		
Solar Regions								
Sunspots								

July 20, 2976

	00–03	03–06	06–09	09–12	12–15	15–18	18–21	21–24
FLARES								
Bursts cm								
Bursts dm								
Bursts m								
Bursts Dkm								
SID								
X-Rays								
Ap 4Q2 Kp	1+	1+	1+	1o	1o	1-	1-	1-
sc								
Aurora USSR								
Aurora W.E.								
Cosmic Rays								
Green Corona	E. Limb 7 days earlier: NE- no data	SE no data	W. Limb 7 days later: NW- no data	SW- no data				
Indices	Rz: 0	10 cm flux: 67	Flare: 0/20.7	Ca: 0.4	Ip: 0	Ia: 0		
Solar Regions	(14331) S01							
Sunspots								

July 21, 1976

	00–03	03–06	06–09	09–12	12–15	15–18	18–21	21–24
FLARES								
Bursts cm								
Bursts dm								
Bursts m								
Bursts Dkm								
SID								
X-Rays								
Ap 3Q1 Kp	1+	1-	0+	1+	2-	1o	0o	0o
sc								
Aurora USSR								
Aurora W.E.								
Cosmic Rays								

Green Corona: E. Limb 7 days earlier: NE- SE- W. Limb 7 days later: NW- no data 330° - 355° SW-
Indices: Rz: 0 10 cm flux: 68 Flare: 0/18.6 Ca: 0.6 Ip: 0 Ia: 0
Solar Regions: (14334) S09
Sunspots:

July 22, 1976

	00–03	03–06	06–09	09–12	12–15	15–18	18–21	21–24
FLARES								
Bursts cm								
Bursts dm								
Bursts m								
Bursts Dkm								
SID								
X-Rays								
Ap 4Q6 Kp	2-	1o	2o	2-	1+	0+	0+	1-
sc								
Aurora USSR								
Aurora W.E.								
Cosmic Rays								

Green Corona: E. Limb 7 days earlier: NE- SE W. Limb 7 days later: NW- no data SW- no data
Indices: Rz: 0 10 cm flux: 68 Flare: 0/18.8 Ca: 0.5 Ip: 0 Ia: 0
Solar Regions: (14332) S01 (14336) N25
Sunspots:

July 23, 1976

	00–03	03–06	06–09	09–12	12–15	15–18	18–21	21–24
FLARES								
Bursts cm								
Bursts dm								
Bursts m								
Bursts Dkm								
SID								
X-Rays								
Ap 5Q8 Kp	2-	2-	1o	1o	2o	1+	1o	0+
sc								
Aurora USSR								
Aurora W.E.								
Cosmic Rays								

Green Corona: E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- SW-
Indices: Rz: 0 10 cm flux: 67 Flare: 0/20.8 Ca: 0.3 Ip: 0 Ia: 0
Solar Regions:
Sunspots:

July 24, 1976

	00–03	03–06	06–09	09–12	12–15	15–18	18–21	21–24
FLARES								
Bursts cm								
Bursts dm								
Bursts m								
Bursts Dkm								
SID								
X-Rays								
Ap 4Q7 Kp	0+	0+	0o	1-	1+	1+	2+	2o
sc								
Aurora USSR								
Aurora W.E.								
Cosmic Rays								

Green Corona: E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- no data SW- no data
Indices: Rz: 0 10 cm flux: 67 Flare: 2/21.7 Ca: 0.2 Ip: 0 Ia: 0
Solar Regions: (14337) S28
Sunspots:

July 25, 1976

	00–03	03–06	06–09	09–12	12–15	15–18	18–21	21–24
FLARES								
Bursts cm								
Bursts dm								
Bursts m								
Bursts Dkm								
SID								
X-Rays								
Ap 9 Kp	4-	2+	2o	2-	3-	2-	1o	2+
sc								
Aurora USSR								
Aurora W.E.								
Cosmic Rays								

Green Corona	E. Limb 7 days earlier: NE- no data	SE- no data		W. Limb 7 days later: NW- no data		SW- no data
Indices	Rz: 0	10cm flux: 67	Flare: 0/17.0	Ca: 0.3	Ip: 0	Ia: 0
Solar Regions						
Sunspots						

July 26, 1976

	00–03	03–06	06–09	09–12	12–15	15–18	18–21	21–24
FLARES								
Bursts cm								
Bursts dm								
Bursts m								
Bursts Dkm								
SID								
X-Rays								
Ap 4Q5 Kp	3-	1-	0o	0o	1-	0+	1o	2-
sc								
Aurora USSR								
Aurora W.E.								
Cosmic Rays								

Green Corona	E. Limb 7 days earlier: NE- no data	SE no data		W. Limb 7 days later: NW- no data		SW- no data
Indices	Rz: 0	10cm flux: 66	Flare: 0/21.4	Ca: 0.3	Ip: 0	Ia: 1
Solar Regions	(14333) S30 (2)	(14341) N48	14338 S40	(14335) N24		(14340) N10
Sunspots						

July 27, 1976

	00–03	03–06	06–09	09–12	12–15	15–18	18–21	21–24
FLARES								
Bursts cm				(mark at ~09.7 UT)				
Bursts dm								
Bursts m								
Bursts Dkm								
SID								
X-Rays								
Ap 8 Kp	1-	1+	1-	3-	2-	1+	3o	3o
sc								
Aurora USSR								
Aurora W.E.								
Cosmic Rays								

Green Corona	E. Limb 7 days earlier: NE- no data	SE- no data		W. Limb 7 days later: NW-		SW-
Indices	Rz: 0	10cm flux: 67	Flare: 0/23.8	Ca: 0.7	Ip: 0	Ia: 0
Solar Regions	(14348) N02					
Sunspots						

July 28, 1976

	00–03	03–06	06–09	09–12	12–15	15–18	18–21	21–24
FLARES								
Bursts cm								
Bursts dm								
Bursts m								
Bursts Dkm								
SID								
X-Rays								
Ap 16 Kp	3+	3-	4-	3o	3+	3o	4-	2+
sc								
Aurora USSR								
Aurora W.E.								
Cosmic Rays								

Green Corona	E. Limb 7 days earlier: NE-	SE		W. Limb 7 days later: NW- no data		SW- no data
Indices	Rz: 0	10cm flux: 67	Flare: 0/23.7	Ca: 0.4	Ip: 0	Ia: 3
Solar Regions						
Sunspots						

July 29, 1976 (00–24 UT)

Row	Data
FLARES	
Bursts cm	
Bursts dm	
Bursts m	
Bursts Dkm	
SID	
X-Rays	
Ap 18D2* Kp	4o, 4-, 3o, 4-, 3-, 3-, 3-, 3+
sc	
Aurora USSR	
Aurora W.E.	
Cosmic Rays	
Green Corona	E. Limb 7 days earlier: NE- no data; SE- no data; W. Limb 7 days later: NW- no data; SW- no data
Indices	Rz: 0; 10cm flux: 67; Flare: 0/21.6; Ca: 1.2; Ip: 0; Ia: 3
Solar Regions	(14349) N32; (14350) N00; (14339) N27
Sunspots	

July 30, 1976 (00–24 UT)

Row	Data
FLARES	
Bursts cm	
Bursts dm	
Bursts m	← ns — (21–24)
Bursts Dkm	
SID	
X-Rays	
Ap 19D1* Kp	3-, 4-, 4-, 4o, 4+, 2+, 3-, 3o
sc	
Aurora USSR	
Aurora W.E.	
Cosmic Rays	
Green Corona	E. Limb 7 days earlier: NE-; SE; W. Limb 7 days later: NW- no data; SW- no data
Indices	Rz: 0; 10cm flux: 69; Flare: 0/22.1; Ca: 1.9; Ip: 0; Ia: 4
Solar Regions	(14344) N33
Sunspots	

July 31, 1976 (00–24 UT)

Row	Data
FLARES	
Bursts cm	
Bursts dm	
Bursts m	— noise storm → (00–15); ← noise storm — (18–24)
Bursts Dkm	
SID	
X-Rays	
Ap 7 Kp	2-, 1+, 2+, 2o, 2+, 2o, 2-, 2o
sc	
Aurora USSR	
Aurora W.E.	
Cosmic Rays	
Green Corona	E. Limb 7 days earlier: NE- no data; SE- no data; W. Limb 7 days later: NW- no data; SW- no data
Indices	Rz: 0; 10cm flux: 70; Flare: 0/22.9; Ca: 3.3; Ip: 0; Ia: 0
Solar Regions	(14342) S21
Sunspots	

REGIONAL FLARE INDEX

INCLUDES ALL FLARES

MC MATH PLAGE NO.	LAT	CMP DATE	DATE FIRST FLARE	DATE LAST FLARE	FLARE-INDEX SUM	FLARE-INDEX MEAN	TOTAL NO. OF FLARES
14328	N 7	76/07/03.4	76/07/15	76/07/15	.84	.84	1
14324	N15	76/07/09.1	76/07/13	76/07/14	2.65	1.33	3
14330	N38	76/07/13.6	76/07/16	76/07/16	1.90	1.90	1
14333	S29	76/07/26.2	76/07/24	76/07/24	2.06	2.06	1

Note:
Because of differences in method of calculation, the dates of Central Meridian Passage for the McMath Plage Regions vary somewhat from those given elsewhere. Any region not listed here produced no flares during its disk passage.

Miscellaneous Data

Contents

	Page
<u>Solar</u> <u>Radio</u> <u>Waves</u>	
Selected Events by Radioheliograph - August 1976	42
" " " " - September 1976	43
" " " " - October 1976	44

SELECTED SOLAR EVENTS

AUGUST 1976

Culgoora

UT Date 1976 AUGUST	HELIOGRAPH EVENT							Spectral Type	REMARKS
	Start (UT)	End (UT)	Freq. (MHz)	Positions		Polar-ization	Inten-sity (1-3)		
				Central Dist. ($R_\odot$)	Position Angle (Deg.)				
31/1	2300	0500	43.25 80 160	1.1	80	ℓ	1 1 2	IS	Type I persisted until 18th, often double, with strong type III activity from same region.
2	0151	0156	80	1.0 .7	30 50	0	3	IIIGG,V	*
			160	.3 .4	30 50	0	3		
7	0201	0212	43.25 80 160	.8 .7 .6	340 350 0	– 0 0	3	II	From same region as type I
8	0208	0211	43.25 80 160	.4 .2 .1	300	– 0 0	3	IIIGG	* Bipolar when strong.
12	2342	2345	43.25 80 160	1.1	320 290 320 320	– 0 0	3 2 2	IIIG,U	*
17	0441	0444	80 160	1.1 1.1 .9	150 150 150	0	3	IIIG,V,U	
29	2300	0500	160	1.1 1.2	80 75	ℓ	1	IS	Double type I source from 28th until 31st.

Days without Heliograph observations: Nil

* Other type III's observed from same position during the day.

SELECTED SOLAR EVENTS

SEPTEMBER 1976

Culgoora

UT Date 1976 SEPTEMBER	HELIOGRAPH EVENT Start (UT)	End (UT)	Freq. (MHz)	Positions Central Dist. ($R_\odot$)	Position Angle (Deg.)	Polar-ization	Inten-sity (1-3)	Spectral Type	REMARKS
31/1	2300	0500	43.25 80 160	.8	45	ℓ	2 1 2	IS	The type I region persisted until 8th, 160 MHz double at times, accompa-nied by type III activity.
1	2244	2247	43.25 80 160	1.25 1.2 1.1	320	- 0 0	2 2 -	IIIG,U *	Other type III's from this region until 4th.
4	0242	0248	43.25 80 160	1.0 .5 .3	230	0	3 3 2	IIIG,U	*
6	0135	0147	80 160	.9 .7	320		3 2	II	Accompanied by possible weak type IV from this region.
9/10	2300	0500	160	.8	140	variable	1	I	Type I activity from this region persisted until 14th, accompa-nied by type III's.
14	0041	0042	80 160	1.2 1.0	90	0	2	IIIG,U	*
17	0129	0132	80 160	1.2 1.1	110	0	2	IIIB	
27	0433	0434	43.25 80 160	1.2 1.1 .9	80	0	1	IIIG,U	
30	0137	0143	43.25 80 160	.4 .5 .5	355 355 350	- 0 0	1	IIIG	

Days without Heliograph observations: Nil

* Other type III's observed at same position during the day.

SELECTED SOLAR EVENTS

OCTOBER 1976

Culgoora

UT Date 1976 OCTOBER	HELIOGRAPH EVENT Start (UT)	End (UT)	Freq. (MHz)	Positions Central Dist. ($R_\odot$)	Position Angle (Deg.)	Polarization	Intensity (1-3)	Spectral Type	REMARKS
1	0424	0426	43.25	.5		–			
			80	.4	0	0	2	IIIGG,V	
			160	.2		0			
2/3	2300	0500	80	1.1	250	ℓ	1		Type I activity from this region persisted until 5th accompanied by type III's.
								IS	
			160	.9	250	r	1		
					320	ℓ			
8	0058	0100	43.25	1.0	300	–	3		
								IIIG,V	*
			80	1.1	280	0	2		
					310	0			
12	0438	0441	43.25	1.2		–	2		
			80	1.2	100	0	2	IIIGG	*
			160	1.1		0	1		
14/15	2300	0500	160	.5	180	ℓ	1	I	
25/26	2300	0500	43.25						
			80	.7	330	variable	1	IS	Type I activity from this region persisted until 30th, with strong type III activity.
			160						
30	0320	0324	43.25	1.5		–	3		
			80	1.5	300	0	2	IIIGG,V	*
			160	2.0		0	3		

Days without Heliograph observations: Nil

* Other type III's observed at same position during the day.

UAG Series of Reports

Prepared by World Data Center A for Solar-Terrestrial Physics, NOAA, Boulder, Colorado, U.S.A.

These reports are for sale through the National Climatic Center, Federal Building, Asheville, NC 28801, Attn: Publications. Subscription price: $25.20 a year; $12.00 additional for foreign mailing; single copy price varies. These reports are issued on an irregular basis with 6 to 12 reports being issued each year. Therefore, in some years the single copy rate will be less than the subscription price, and in some years the single copy rate will be more than the subscription price. Make check or money order payable to: Department of Commerce, NOAA.

Some issues are now out of print and are available only on microfiche as indicated. Requests for microfiche should be sent to World Data Center A for Solar-Terrestrial Physics, NOAA, Boulder, CO 80302, with check or money order made payable to Department of Commerce, NOAA.

UAG-1 "IQSY Night Airglow Data", price $1.75.
UAG-2 "A Reevaluation of Solar Flares, 1964-1966", price 30 cents.
UAG-3 "Observations of Jupiter's Sporadic Radio Emission in the Range 7.6-41 MHz, 6 July 1966 through 8 September 1968", microfiche only, price 45 cents.
UAG-4 "Abbreviated Calendar Record 1966-1967", price $1.25.
UAG-5 "Data on Solar Event of May 23, 1967 and its Geophysical Effects", price 65 cents.

UAG-6 "International Geophysical Calendars 1957-1969", price 30 cents.
UAG-7 "Observations of the Solar Electron Corona: February 1964-January 1968", price 15 cents.
UAG-8 "Data on Solar-Geophysical Activity October 24-November 6, 1968", price (includes Parts 1 & 2) $1.75.
UAG-9 "Data on Cosmic Ray Event of November 18, 1968 and Associated Phenomena", price 55 cents.
UAG-10 "Atlas of Ionograms", price $1.50.

UAG-11 "Catalogue of Data on Solar-Terrestrial Physics" (now obsolete).
UAG-12 "Solar-Geophysical Activity Associated with the Major Geomagnetic Storm of March 8, 1970", price (includes Parts 1-3) $3.00.
UAG-13 "Data on the Solar Proton Event of November 2, 1969 through the Geomagnetic Storm of November 8-10, 1969, price 50 cents.
UAG-14 "An Experimental, Comprehensive Flare Index and Its Derivation for 'Major' Flares, 1955-1969", price 30 cents.
UAG-15 "Catalogue of Data on Solar-Terrestrial Physics" (now obsolete).

UAG-16 "Temporal Development of the Geographical Distribution of Auroral Absorption for 30 Substorm Events in each of IQSY (1964-65) and IASY (1969)", price 70 cents.
UAG-17 "Ionospheric Drift Velocity Measurements at Jicamarca, Peru (July 1967-March 1970)", microfiche only, price 45 cents.
UAG-18 "A Study of Polar Cap and Auroral Zone Magnetic Variations", price 20 cents.
UAG-19 "Reevaluation of Solar Flares 1967", price 15 cents.
UAG-20 "Catalogue of Data on Solar-Terrestrial Physics" (now obsolete).

UAG-21 "Preliminary Compilation of Data for Retrospective World Interval July 26 - August 14, 1972", price 70 cents.
UAG-22 "Auroral Electrojet Magnetic Activity Indices (AE) for 1970", price 75 cents.
UAG-23 "U.R.S.I. Handbook of Ionogram Interpretation and Reduction", price $1.75.
UAG-24 "Data on Solar-Geophysical Activity Associated with the Major Ground Level Cosmic Ray Events of 24 January and 1 September 1971", price (includes Parts 1 and 2) $2.00.
UAG-25 "Observations of Jupiter's Sporadic Radio Emission in the Range 7.6-41 MHz, 9 September 1968 through 9 December 1971", price 35 cents.

UAG-26 "Data Compilation for the Magnetospherically Quiet Periods February 19-23 and November 29 - December 3, 1970", price 70 cents.
UAG-27 "High Speed Streams in the Solar Wind", price 15 cents.
UAG-28 "Collected Data Reports on August 1972 Solar-Terrestrial Events", price (includes Parts 1-3) $4.50.
UAG-29 "Auroral Electrojet Magnetic Activity Indices AE (11) for 1968", price 75 cents.
UAG-30 "Catalogue of Data on Solar-Terrestrial Physics", price $1.75.

UAG-31 "Auroral Electrojet Magnetic Activity Indices AE (11) for 1969", price 75 cents.
UAG-32 "Synoptic Radio Maps of the Sun at 3.3 mm for the Years 1967-1969", price 35 cents.
UAG-33 "Auroral Electrojet Magnetic Activity Indices AE (10) for 1967", price 75 cents.
UAG-34 "Absorption Data for the IGY/IGC and IQSY", price $2.00.
UAG-35 "Catalogue of Digital Geomagnetic Variation Data at World Data Center A for Solar-Terrestrial Physics", price 20 cents.

UAG-36 "An Atlas of Extreme Ultraviolet Flashes of Solar Flares Observed Via Sudden Frequency Deviations During the ATM-SKYLAB Missions", price 55 cents.
UAG-37 "Auroral Electrojet Magnetic Activity Indices AE (10) for 1966", price 75 cents.
UAG-38 "Master Station List for Solar-Terrestrial Physics Data at WDC-A for Solar-Terrestrial Physics", price $1.60.
UAG-39 "Auroral Electrojet Magnetic Activity Indices AE (11) for 1971", by Joe Haskell Allen, Carl C. Abston and Leslie D. Morris, National Geophysical and Solar-Terrestrial Data Center, Environmental Data Service, February 1975, 144 pages, price $2.05.

UAG-40 "H-Alpha Synoptic Charts of Solar Activity For the Period of Skylab Observations, May, 1973-March, 1974", by Patrick S. McIntosh, NOAA Environmental Research Laboratory, February 1975, 32 pages, price 56 cents.

UAG-41 "H-Alpha Synoptic Charts of Solar Activity During the First Year of Solar Cycle 20, October, 1964 - August, 1965", by Patrick S. McIntosh, NOAA Environmental Research Laboratory, and Jerome T. Nolte, American Science and Engineering, Cambridge, Massachusetts, March 1975, 25 pages, price 48 cents.

UAG-42 "Observations of Jupiter's Sporadic Radio Emission in the Range 7.6-80 MHz 10 December 1971 through 21 March 1975", by James W. Warwick, George A. Dulk, and Anthony C. Riddle, Department of Astro-Geophysics, University of Colorado, Boulder, Colorado 80302, April 1975, 49 pages, price $1.15.

UAG-43 "Catalog of Observation Times of Ground-Based Skylab-Coordinated Solar Observing Programs", compiled by Helen E. Coffey, World Data Center A for Solar-Terrestrial Physics, May 1975, 159 pages, price $3.00.

UAG-44 "Synoptic Maps of Solar 9.1 cm Microwave Emission from June 1962 to August 1973", by Werner Graf and Ronald N. Bracewell, Radio Astronomy Institute, Stanford University, Stanford, California 94305, May 1975, 183 pages, price $2.55.

UAG-45 "Auroral Electrojet Magnetic Activity Indices AE (11) for 1972", by Joe Haskell Allen, Carl C. Abston and Leslie D. Morris, National Geophysical and Solar-Terrestrial Data Center, Environmental Data Service, May 1975, 144 pages, price $2.10.

UAG-46 "Interplanetary Magnetic Field Data 1963-1974", by Joseph H. King, National Space Science Data Center, NASA Goddard Space Flight Center, Greenbelt, Maryland 20771, June 1975, 382 pages, price $2.95.

UAG-47 "Auroral Electrojet Magnetic Activity Indices AE (11) for 1973", by Joe Haskell Allen, Carl C. Abston and Leslie D. Morris, National Geophysical and Solar-Terrestrial Data Center, Environmental Data Service, June 1975, 144 pages, price $2.10.

UAG-48A "Synoptic Observations of the Solar Corona during Carrington Rotations 1580-1596 (11 October 1971 - 15 January 1973)", [Reissue with quality images] by R. A. Howard, M. J. Koomen, D. J. Michels, R. Tousey, C. R. Detwiler, D. E. Roberts, R. T. Seal and J. D. Whitney, E. O. Hulbert Center for Space Research, NRL, Washington, D. C. 20375 and R. T. and S. F. Hansen, C. J. Garcia and E. Yasukawa, High Altitude Observatory, NCAR, Boulder, Colorado 80303, February 1976, 200 pages, price $4.27.

UAG-49 "Catalog of Standard Geomagnetic Variation Data", prepared by Environmental Data Service, NOAA, Boulder, Colorado, August 1975, 125 pages, price $1.85.

UAG-50 "High-Latitude Supplement to the URSI Handbook on Ionogram Interpretation and Reduction", by W. R. Piggott, British Antarctic Survey, c/o SRC, Appleton Laboratory, Ditton Park, Slough, England, October 1975, 292 pages, price $4.00.

UAG-51 "Synoptic Maps of Solar Coronal Hole Boundaries Derived from He II 304Å Spectroheliograms from the Manned Skylab Missions", by J. D. Bohlin and D. M. Rubenstein, E. O. Hulbert Center for Space Research, Naval Research Laboratory, Washington, D. C. 20375 U.S.A., November 1975, 30 pages, price 54 cents.

UAG-52 "Experimental Comprehensive Solar Flare Indices for Certain Flares, 1970-1974", compiled by Helen W. Dodson and E. Ruth Hedeman, McMath-Hulbert Observatory, The University of Michigan, 895 Lake Angelus Road North, Pontiac, Michigan 48055 U.S.A., November 1975, 27 pages, price 60 cents.

UAG-53 "Description and Catalog of Ionospheric F-Region Data, Jicamarca Radar Observatory (November 1966 - April 1969)", by W. L. Clark and T. E. Van Zandt, Aeronomy Laboratory, NOAA, Boulder, Colorado 80302 and J. P. McClure, University of Texas at Dallas, Dallas, Texas 75230, April 1976, 10 pages, price 33 cents.

UAG-54 "Catalog of Ionosphere Vertical Soundings Data", prepared by Environmental Data Service, NOAA, Boulder, Colorado 80302, April 1976, 130 pages, price $2.10.

UAG-55 "Equivalent Ionospheric Current Representations by a New Method, Illustrated for 8-9 November 1969 Magnetic Disturbances", by Y. Kamide, Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, Colorado 80302 and Geophysical Institute, University of Alaska, Fairbanks, Alaska 99701, H. W. Kroehl, Data Studies Division, NOAA/EDS/NGSDC, Boulder, Colorado 80302, M. Kanamitsu, Advanced Study Program, National Center for Atmospheric Research, Boulder, Colorado 80303, J. H. Allen, Data Studies Division, NOAA/EDS/NGSDC, Boulder, Colorado 80302, and S.-I. Akasofu, Geophysical Institute, University of Alaska, Fairbanks, Alaska 99701, April 1976, 91 pages, price $1.60.

UAG-56 "Iso-intensity Contours of Ground Magnetic H Perturbations for the December 16-18, 1971 Geomagnetic Storm", by Y. Kamide, Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, Colorado 80302 and Geophysical Institute, University of Alaska, Fairbanks, Alaska 99701 (currently Guest worker at Data Studies Division, NOAA/EDS/NGSDC, Boulder, Colorado 80302), April 1976, 37 pages, price $1.39.

UAG-57 "Manual on Ionospheric Absorption Measurements", edited by K. Rawer, Institut für Physikalische Weltraumforschung, Freiburg, G.F.R., June 1976, 202 pages, price $4.27.

UAG-58 "ATS6 Radio Beacon Electron Content Measurements at Boulder, July 1974 - May 1975", by R. B. Fritz, Space Environment Laboratory (currently with Wave Propagation Laboratory), NOAA, Boulder, Colorado 80301 USA, September 1976, 61 pages, price $1.04.

UAG-59 "Auroral Electrojet Magnetic Activity Indices AE(11) for 1974", by Joe Haskell Allen, Carl C. Abston and Leslie D. Morris, National Geophysical and Solar-Terrestrial Data Center, Environmental Data Service, December 1976, 144 pages, price $2.16.

USCOMM-NOAA-ASHEVILLE--2-28-77--950